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UNIVERSITY OF ALBERTA

The Discrimination Of Basic Facial Expressions By Children With And Without Down Syndrome

BY

JANE ALEXANDER

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master Of Education in Special Education.

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

Edmonton

Alberta

Fall 1993

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The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled The Discrimination Of Basic Facial Expressions By Children With And Without Down Syndrome submitted by Jane Alexander in partial fulfillment of the requirements for the degree of Master of Education in Special Education.

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Date 24th September 1993

Abstract

There has been considerable research into how children interpret facial expressions of emotion. Much research has used black and white photographs of adults posing various emotion, or has stemmed from the use of cartoons or videotapes of story scenarios. Little research has considered the use of unfamiliar children presented in color photograph format for such discrimination tasks. It was felt that in terms of social interaction it is important to see whether children can interpret the facial expressions of other children.

It is possible that the differences in the performance of children on these discrimination tasks found in the literature was affected by their developmental level. The present study considered the performance of a group of children with Down syndrome and compared them with both chronological age (CA) and mental age (MA) match comparison groups. The sixty-one children in the study were required to complete two sorting tasks. The children had to sort two sets of photographs into happy and sad categories. The photographs were of children of similar age to the subjects and were face only (out of context) or were of children engaged in everyday activities (in context). The children were asked to justify their decision and their responses were audiotaped and later transcribed and coded in the hope that this would give some insight into possible developmental changes in the information used to reach a decision. In addition to the sorting tasks a measure of mental ability was taken for all the children using the Peabody Picture Vocabulary Test (Revised) (Form M). This enabled the MA match comparison.

Of interest were: 1)a comparison of performance on the sorting task

between the groups of children, 2)a comparison of performance on the sorting tasks related to use of in context or out of context photographs, and 3) and differences in the types of responses made by the children during the sorting tasks. The main data analysis involved a comparison between the five groups of children in the study, namely a group of children with Down syndrome, a group of CA matched children without Down syndrome, a slightly younger group of children without Down syndrome, a group of MA matched children without Down syndrome and finally a small group (N=6) of children with unspecified developmental delays.

The results of the study showed that difference in performance on the sorting tasks appeared to be related to mental age as measured by the PPVT. There appeared to be little difference in performance on the sorting tasks related to contextual information in the photographs. The groups of children differed in the distribution of their justifications during the sorting tasks. Here again the children with Down syndrome were most similar to the MA matched group and most unlike the CA matched group. Interestingly, the group of developmentally delayed children performed at the level of the CA matched group on the sorting tasks and gave a similar spread of responses, although this group tended to base their justifications in the sorting tasks on inferential information. All of the other children to a greater or lesser extent seemed to base their justifications on either specific or general facial information.

The above results are discussed in relation to possible hypotheses for their occurence and also in the context of social interaction and development. One implication of these findings is that perhaps we assume a base line of affective

knowledge and development that does not exist in young children with Down syndrome. Suggestions for future research are made; in particular a follow up study with older children with Down syndrome which could provide information as to whether this is an area of developmental lag or deficit.

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CHAPTER 1. INTRODUCTION

The study of emotion has a long history in the Child Development literature. This dates back to Darwin's seminal book, "The Expression Of The Emotions in Man and Animals" published in 1872. Discrete emotions theory used by many developmental psychologists is based on the work of Darwin and is characterized by the work of Izard. Despite such a long history, research into emotional development became a neglected area of psychology until a sudden resurgence of interest in the early 1980s. "In recent years, emotions and emotional development have become fashionable topics and areas of research because they have finally been recognized as neglected areas of developmental psychology" (Cicchetti & Hesse, 1982; p.1).

"The development of the component of emotion which we call facial expression, plays a critical role in the development of social responsiveness" (Izard, 1971; p.319). Social responsiveness could be interpreted as the ability to clearly recognize emotions visually, in the self, and in others; and to be able to express them. This competence is important for accurate communication and regulation of relationships. Theories of child development stress the significance of social integration/acceptance. "The early acquisition of emotional knowledge suggests that emotional behavior is central to social adaptive functioning" (Lewis and Saarni, 1985; p.137). The literature demonstrates that the ability to name and point out emotional expressions increases with age, and that there is a linear increase in appropriate situation interpretation across age levels.

Izard (1971) has stated that young preschoolers can match category labels with the appropriate expressions, yet it is difficult to say what underlies their

responses. Bullock and Russell (1984, 1985) suggested that the way in which preschoolers categorize even prototypical expressions of emotion is not equivalent to the way that adults do so. In normal development children become increasingly aware of and able to label the emotional states, intentions and cognitions of both themselves and others (Bretherton and Beeghly, 1982). Normal development being defined in terms of "... a series of interlocking social, emotional and cognitive/ representational competencies. Competence at one period of development, which tends to make the individual broadly adapted to his or her environment, prepares the way for the formation of competence at the next" (Cicchetti & Ganiban, 1990; p.172).

This study considered whether the development of exceptional children, and in this case, of children with Down syndrome, would mirror normal development. To be sure that it was the presence of Down syndrome that made a difference the two extraneous variables of chronological age and mental age were controlled for by using CA and MA matched groups for the group of children with Down syndrome. All of the children in this study were provided with two tasks requiring judgement of the discrete emotions of happiness and sadness. The children were then asked to justify the choices they had made, in this way it was hoped that the investigator would gain insight into their categorization.

The consideration of the development of children with Down syndrome has received some attention in the recent research literature. Children with Down syndrome are etiologically homogeneous and their condition is detectable at birth. However their development is heterogeneous, and these children range from having severe mental retardation to the average/normal range

of mental abilities. Research is available which considers the development of these children in relation to children without Down syndrome. Development in children with Down syndrome is concluded to be a 'different' process.

There is a relationship between affect and cognition in children with Down syndrome. The higher the level of cognitive functioning the greater the differentiation of emotion (Cicchetti & Sroufe, 1976; 1978; and Hesse & Cicchetti, 1983). The present study examined this relationship by taking a measure of Mental Age (MA) as an estimate of cognitive functioning. It was expected that such a relationship would result in poorer performance on the sorting task by the lower MA children.

"The human face is without doubt the primary vehicle for early development and exercise of the emotions" (Izard, 1971; p.317). Darwin (1872) commented on the similarity of facial expressions across national and cultural boundaries. Darwin held that there is an innate universal basis to emotional expressions, and also that humans have an innate ability to recognize facial expressions of emotion. In the literature review, with respect to children especially, evidence will be examined which supports or refutes these theories.

Borke's (1971) review of research on the interpersonal perception of young children indicated that as children get older and acquire more experience with interpersonal relationships they "... become increasingly knowledgeable about the thoughts, feelings and motives of other people" (p. 263). Camras & Allison (1985) found that when children were given a verbal description of events leading to someone feeling a particular emotion, then even four year old children could choose correct facial expressions for happiness, sadness, anger, disgust, fear

and surprise.

Emotion descriptive language first emerges at around twenty months of age and increases rapidly during the third year (Bretherton & Beeghly, 1982). The role of emotion descriptive language is important in the study of children's understanding of emotion, social perception, attribution and social cognition (Ridgeway, Waters and Kuczaj, 1985).

The present study considered the children's justification of their choice of a happy or sad label for the photographs in the sorting task as an outcome measure. Justification requires verbal skill from the children and therefore may be open to question. Chapman (1989) reflected that whilst Piaget's classical method makes use of children's judgements and explanations it can be unduly taxing for the child, particularly a child with weak verbal skills. Furthermore Chapman states that giving an explanation involves certain performance factors unrelated to the competence being assessed. However it was felt that this information, where available, would give valuable insight into the child's reasoning. It was recognized that the child's understanding of facial expressions, estimated by judgement, may be underestimated by the use of correct justification as an outcome measure. Therefore this information was considered separately from the data analysis of performance on the sorting tasks. It was recognized from the outset that some children would have the ability to interpret the emotion and complete the task yet lack the necessary verbal skills to give a satisfactory explanation. Emotional appraisals are based on "perceptual/cognitive input, but the processing of this input need not necessarily take place at a conscious level" (Bretherton et al, 1986; p.530).

The study attempted to investigate and compare the interpretive abilities of children with and without Down syndrome, to distinguish between the emotions of happiness and sadness. Previous research has shown that young children have a preference for facial cues and that these facial expressions are highly correlated with emotional development (Gnepp, 1983). It has been reported that kindergarten children show increased understanding of other children's feelings following reflection of their own emotions/reactions to similar situations (Hughes, Tingle and Sawin, 1981). There is little data available on the understanding of other children's feelings as expressed by facial expressions by young children with Down syndrome. Such information would be useful when considering the integration of these children. Successful social development depends upon the child being able to interpret the actions and feelings of another person. One of the main indicators of mood and response is a person's facial expression. If a child cannot correctly interpret the facial expressions of their peers then this will affect their ability to form friendships and interact in a school or playground setting.

The study used a dual comparison procedure of both chronological age (CA) and mental age (MA) comparisons. If the child's mental age and not the presence of Down syndrome is a major influence then there should be little difference between the MA matched groups. If, on the other hand, chronological age is the major influence then differences should occur between the different age groups. The third possibility was that the presence of Down syndrome was the major influence on test performance and in this case the group of children with Down syndrome would perform differently from both the MA and CA matched children without Down syndrome. If this third possibility was so then there are

important implications for social skills teaching for these children. If significant differences are also detected in the criteria these children use to justify their responses this information could be used in interpreting the behavior of these children in elementary school. This information may also highlight areas for inclusion in a social skills training program.

Thompson (1985) saw deficits in ability to interpret the emotions and feelings of others from facial expressions, as leading to disturbed social relationships and even social isolation. Identification of children who may be poor in the area of social responsiveness would mean that these children could have enhanced social skills training in specific areas. This training may include work on perceptual skills to discriminate emotional expressions, and thus provide examples of social referencing. It may be possible to build in experiences in the classroom where children are shown that emotive cues such as facial expressions have a certain predictive value (Bandura, 1986). Enhancing children's skills of social perception and responsiveness would have a positive effect on social relationships and possibly, successful integration.

CHAPTER 2. REVIEW OF THE LITERATURE

In order to research the presence of Down syndrome in children, and it's possible effect on ability to discriminate between the basic facial expressions of happy and sad it is necessary to examine existing research in this are. Literature on the emotional and cognitive development of children with and without Down syndrome was reviewed.

This chapter is organized under six sections. The first two sections look at development in children with and without Down syndrome. The research indicates that a close link between cognitive and emotional (affective) development exists. These two areas of development will be discussed here more extensively. Support for the relationship between emotion and cognition will be discussed in the following section. Next the importance of facial expressions in the development process is examined. A summary of the main points follows and the rationale for the present study is given. Finally the research questions and hypotheses for the study are posed.

Cognitive And Emotional Development of Children Without Down Syndrome

Emotional Development

It is far easier to say what emotions do rather than say what they are. It seems obvious that emotional development is of crucial importance to the child but just why is this so? The emotions of the child play a role in forming relationships and interpreting the world. They regulate social and interpersonal behavior. Emotions "...regulate internal psychological processes" (Campos, Barrett, Lamb, Goldsmith and Stenberg, 1983; p.784). Early behaviorist theories, e.g. Watson, gave emotional reactions a central role in explaining behavior.

Two major theoretical models of defining and categorizing human emotions, the Discrete emotions model and the Dimensional model, are described here. The discrete emotions model is based on the work of Darwin (1872) and is characterized in the work of Izard. Discrete emotions theory states that a number of fundamental emotions are conceptualized as separate processing systems that appraise different types of information, and motivate different types of behavior (Bretherton et al, 1986; p.532). This model has most often been used in the study of facial expressions.For a fuller description of the model see Izard (1971, 1977, 1978) and Tomkins (1962, 1963). The Dimensional model defines emotions in terms of at least two dimensions such as hedonic tone and activation. The majority of studies looking at facial expressions of emotion have used the Discrete emotions model. Referring to the work of Arnold (1960), Ridgeway and Russell (1985) and Russell and Mehrabian (1977) Bretherton (1980) states that the Dimensional model is most frequently used in studies looking at the acquisition and use of emotion-denoting words.

Other models of emotional development discussed by Casey (1993) consider the social context and history of the child and the way in which they combine to influence, organise and mediate the child's use of "biologically based expressive and receptive emotion systems. The immediate context in which these systems are evoked influences how children manage their expressive behavior (Campos, Campos & Barrett,1989). This expressive behavior, in turn, can influence children's understanding and report of their emotional response" (Casey, 1993; p.119).

The research available on emotional development comes from two

branches of developmental psychology. There is a great deal of descriptive, qualitative work into early emotional development based on psychoanalytic theory (Bowlby,1984; Emde, 1980; Freud,1968; Mahler, 1983; Spitz, 1950 and Weininger, 1984). There is also much quantitative empirically derived developmental research based on cognitive psychology (Case, 1985; Chi, 1983; Fischer, 1980).

What stages of development are logically necessary? At different stages of development changes in temperament are dependent upon the re-organisation and interaction of cognitive abilities, self-regulation and reactivity (Cicchetti & Ganiban, 1990).

Children become increasingly able to label the emotional states, intentions and cognitions of both themselves and others (Bretherton & Beeghly, 1982). The use of self regulated language becomes increasingly decontextualized, with children first speaking about themselves in the present, and then discussing the actions and supposed feelings of other people or of hypothetical contexts.

Babies can produce discrete, recognisable facial expressions (Izard, Heubner, Risser, McGinnes, & Dougherty, 1980). Infants, even in the first few days of life can produce appropriate and discriminatory expressions. Infants can respond appropriately to different facial expressions (Termine & Izard, 1988). "Infants' social behavior changes appropriately and non imitatively in response to the different facial expressions of their caretaker from ten weeks and upward" (Harris, 1989; p.25).

By six months of age babies will laugh in response to stimulation and exhibit frustration or rage by crying in response to failed expectations. In other

words, the infant is learning how to manipulate the environment/caregiver, through her/his own actions. By one year children develop a secure attachment to major caregivers and exhibit a wide repertoire of behavioral responses.

During the second year of life children no longer simply react to other's emotions. They can anticipate the possibility of bringing about another different emotion. By the age of two children have started to describe themselves and others as perceiving, feeling emotion, having desires and entering into various cognitive states (Bretherton, McNew, & Beeghly-Smith, 1981). Empathic acts emerge at this time e.g. helping, comforting (Zahn-Waxler & Radke-Yarrow, 1982).

A child's understanding of another's emotional state may require them to imagine the feelings, beliefs and desires of the other child or adult. Harris, (1989), stated that young children are "...aware of their own mental states, and can project them on to other people using a mechanism that depends crucially on the imagination" (p.53). This argument relies upon the child being self aware, having the capacity for pretence (imagination), being able to distinguish reality from pretence, the ability to engage in an imaginative understanding of other people's mental states. It is possible that these abilities develop with time, but perhaps the child's capacity for imagination and pretence is innate and in some case, for example in the presence of a syndrome such as Down syndrome, does not develop in the same way as in other children. If a child has the ability to pretend then they can imagine the feelings a person would have in a certain situation without sharing them. They can then use such make-believe premises to reach new conclusions. (Dial & Harris, 1988; Harris, 1989). Harris, (1989), further illustrates this point by

drawing an analogy between imagination and Craik's idea of using a working model in our head to make predictions about reality.

There are age related changes in children's emotion expression and verbalization (Bretherton, Fritz, Zahn-Waxler & Ridgeway, 1986; Campos, Barrett, Lamb, Goldsmith & Stenberg, 1983; Ridgeway, Water & Kuczaj, 1985; Russell & Bullock, 1985,1986). Children of between three and four years of age understand that emotion can be caused by situations (Borke, 1971),and by desires (Wellman & Bartsch, 1988). The children become increasingly able to label emotions, intentions and cognitions and exhibit this social awareness in their symbolic play (Beeghly & Cicchetti, 1987). Four to six year olds understand that beliefs can affect emotion (Borke, 1971). At around age four children begin to exhibit a mechanism for working out another person's emotion even when that emotion does not correspond to what they themselves would want or feel (Harris, Johnson, Hutton, Andrews & Cooke, 1989).

The experience and recognition of the various emotions is held to proceed in a fairly hierarchical way beginning with happiness, anger and sadness. Between the ages of four and ten children begin to understand the conditions under which pride, shame and guilt are experienced. They become aware that the emotional state of one person is influenced by the emotional state of another.

Cognitive Development

The study of cognitive development by psychologists has burgeoned in recent years. This can be attributed to technological advances e.g. eye movement cameras, video recorders and computers, and also to the development of methods of study of infant cognition. (See Flavell (1992) for a discussion of

recent research.) Improved imaging techniques such as Magnetic Resonance Imaging (MRI) have improved our knowledge of and ability to study, the brain.

"Cognitive development results from the interactions of individuals with their physical and social environments" (Ormrod, 1990; p.139). A great deal of information on cognitive development is available, not only cognitive development of children developing typically, but of children exhibiting exceptionalities also. Research has considered the developmental process as a whole and also in specific areas. Brown & Campione (1986) stated their belief that by being able to acquire a detailed description of the cognitive processes required for particular tasks it is possible to more precisely identify children's individual differences. Cognitive development is a rich, complex and multifaceted process (Flavell, 1992). What is meant by cognitive development? The development of specific cognitive functions - planning, attention and arousal, and successive and simultaneous processing, gives rise to the following: a) growth of information processing capacity; b) development of a child's knowledge bases; c) the ability to apply strategies; d) abstract reasoning; e) the acquisition of metacognitive knowledge and experiences (Das, 1991; Flavell, 1992).

Children's social-cognitive competence shows a dramatic increase during the second year of life. This competence indicates a growing self awareness in the child (Kagan, 1981). The child becomes more aware and able to evaluate the actions, emotions and intentions of themselves and of others. Other-awareness is a cognitive capacity necessary for the development of empathy. This capacity develops from the infant's ability to react to the emotional expressions of others with the same emotion, through to the child's ability to react to another's

emotional state but knowing that it is distinct from their own (Asendorpf & Baudonniere, 1993).

Cognitive functions have been conceptualized as involving planning, coding and arousal by Luria (in Das, 1991). These functions in Das' PASS model of information processing are planning, attention and arousal, and successive and simultaneous processing. These five cognitive functions are proposed to underly most of the developing child's behaviors. They influence short term memory and also retrieval and recall from long term memory.

By entry to school at age five, we commonly expect to see children developing complex and fluent language, integrating visual, auditory and contextual cues and distinguishing between important and unimportant information and interpreting figurative language (Shields, 1991).

The stage theory of Piaget states that a child's cognitive structures dictate what the child accommodates and assimilates and that this is an active process. It is now assumed that in addition to certain regular stagelike specific increases in cognitive abilities, there is also a general all pervasive cognitive development. This view come from the information processing approach to development. "As the child's information processing capacity increases with increasing age, it makes possible new and more complex forms of cognition in all content domains, because the child can now hold in mind and think about more things at once" (Flavell, 1992; p.1000).

Findings from research indicate that there is a relationship between affective expression and cognitive development. Identifying lags in affective development has implications for the educator (Gallagher, 1986). Researchers

have also considered the relationship between affect, cognition and the use of language to describe emotions (Ridgeway, Waters & Kuczaj, 1985; Russell & Ridgeway, 1983; Bullock & Russell, 1984; and Gallagher, 1991). In Schachter and Singer's 1962 theory of physiological arousal, cognition and emotion, emotion was conceptualised as a composite of autonomic arousal plus cognition. Accordingly, to understand emotion one must understand cognition (Campos et al, 1983: p.786). In the past ten years a number of studies appeared which considered the link between cognitive and emotional development. The areas considered in these studies were research into empathy (Bruchkowsky,1984, 1991; Zahn-Waxler, Radke-Yarrow,Wagner, & Chapman, 1992), social competence (Bretherton, Fritz, Zahn-Waxler & Ridgeway, 1986; Casey, 1993) and facial expression (Izard & Dougherty, 1982; Malatesta & Haveland, 1982; Walden & Field, 1982; Russell & Bullock, 1986; Kestenbaum, 1992).

Izard (1971) suggested that some basic emotions systems emerge at particular points in development, synchronous with, but not caused by, developments in motor, perceptual and cognitive capacities (Campos et al, 1983). Perceptions of facial expressions are deemed crucial for the experience of emotional states. The development of the expressive capacity is a major criterion for concluding that the emotion has developed.

"The movements of expression in the face and body, whatever their origin may have been, are in themselves of much importance for our welfare. They serve as the first means of communication between the mother and her infant, she smiles approval, and thus encourages her child on the right path, or frowns disapproval" (Darwin, 1872; p.364).

Stage theories of child development such as Piaget indicate that children's understanding of emotion may "...be a function of their cognitive development, such that some aspects of children's understanding of emotion appear to develop in an age-related series of stages" (Casey, 1993; p.119). Other neo-Piagetian theories, such as Case (1985), agree with a developmental progression through early childhood in which children move from lower to higher stages. Yet this is somewhat different from emotional development which appears to be more flexible "with movement back and forth, overlap between positions [stages] and individual variations being normal as well as expected" (Hayward, 1986; p.13).

Erikson (1963) stated that adequately socialised children successfully move through a succession of psychosocial stages that begin with trust in others and eventuate in adulthood with a socially approved sense of self. This concept finds support in the work of Piaget (1962), Kohlberg (1969) and Bandura (1977).

In Piaget's work, social sensitivity, like cognition is held to proceed in a series of hierarchical stages. However observations of the interaction of young children suggest that they are not only aware that others have feelings, but also actively try to understand these feelings they observe at a far earlier age than implied by Piaget. Borke (1971) found that awareness of happy reactions in other people appears to be well established as early as three or three and a half years of age. Michalson and Lewis (1982) found that even by the age of two, children understand relationships between emotional expressions and situations. Bandura (1986) stated that "the ability to read signs of emotions such as happiness, fear and anger has considerable adaptive value in guiding actions towards others"

(Bandura, 1986; p.309).

Emotional And Cognitive Development In Children With Down Syndrome

The next part of this literature review will discuss some of the more recent research which suggests that the presence of Down syndrome results in a particular developmental pattern which is not the same as that followed by children with other disabilities. Individuals of a common etiology such as Down syndrome, often display patterns of behavioral strengths and weaknesses unique to that group. Down syndrome is "invariably associated with trisomy of chromosome 21. In 95% of cases we see meiotic disjunction with triplication of the entire chromosome. In 4 - 6% translocation of part of chromosome 21 to another chromosome and in 1 - 4% the cells are a mosaic of normal and trisomic cells as the result of non - disjunction in early embryonic development" (Kemper, 1988, p.21). A study by Fishler & Koch (1991) found that children with mosaicism Down syndrome had higher IQs than those with non mosaicism Down syndrome, they also had better verbal and visual perceptual skills. Within the Down syndrome group there are felt to be two distinct developmental patterns for those with mosaicism and those with trisomy 21.

Research into the developmental process in children with Down syndrome is interesting in that it has been carried out both in terms of its relationship to normal development and also as a 'different' process.

Early deviations in development may cause problems for children later on. The development of children with Down syndrome may be charted from birth owing to the etiological homogeneity of the syndrome itself. It was once felt

that there was nothing that set the child with Down syndrome apart from other children exhibiting intellectual challenges (Ellis & Cavaler, 1982; Fisher & Zeaman, 1970). The presence of Down syndrome gives rise to intellectual challenges of organic origin, i.e., a chromosomal abnormality. The view of some early researchers was that however such challenges came about, whether it be due to genetics, pathology, seizures etc., the maturational results should be the same. In the following sections research will be reported that specifically looks at the development of children with Down Syndrome.

Emotional Development

Infants with Down syndrome generally exhibit poor eye contact, dampened affect intensity, higher arousal thresholds, and absence of crescendoing during face to face interactions (Cicchetti, Toth, Bush & Gillespie, 1988). They are slower to develop laughter to a variety of stimuli presented by their mothers (Cicchetti & Sroufe, 1976). They laugh and cry far less often than MA matched babies without Down syndrome.In spite of all this most of these children form secure attachment relationships with their caregivers (Thompson, Cicchetti, Lamb & Malkin, 1985).

Neuroanatomical studies suggest differences in maturational components of temperament exist between children with and without Down syndrome. Possible restrictions may occur on the growth and maturation of capacities that underlie and guide temperament. "These restrictions may place restraints on the rate of development and the onset of transition and changes in temperament characteristics" (Cicchetti & Ganiban, 1990; p.179). Such restrictions may be caused by differences in the arousal systems of children with

Down syndrome. This is due to abnormalities in the functioning and activity of the neurotransmitter systems and differences in dendritic maturation.

"The dampened emotionality and passive interaction with the world on the part of the infants with Down syndrome reported by Sorce and Emde (1982) are congruent with the hypothesis that Down syndrome is characterized by a decreased reactivity of arousal systems to stimulation" (Ganiban, Wagner & Cicchetti, 1990; p.74).

By the time children with Down syndrome reach an MA of two they become self aware (as demonstrated in a number of studies using the mirror-and-rouge paradigm). This self awareness is tied to cognitive development rather than age alone.

Cognitive Development

In children with Down syndrome, just as in others, affect and cognition are intimately related. The higher the level of cognitive functioning, the greater the differentiation of emotion (Cicchetti & Sroufe, 1976; 1978). Motti, Cicchetti and Sroufe (1983) found that affective motivational play style e.g. enthusiasm, positive affect, significantly correlated with level of cognitive development. Research studies on CA comparisons have suggested that children with Down syndrome are perceived as less intense in their expressions of affect than normally developing infants (Rothbart & Hanson, 1983). Cognitive development is continuous but slows progressively and results in a general decline of measured intelligence throughout infancy and early childhood. This apparent decline may reflect the fact that cognitive tests increasingly become more demanding in terms of adaptive behavior and problem solving. The tests also

reflect a greater reliance on language based test items.

Children with Down syndrome are believed to have delayed information processing, they seem less interactive with their environment. More specifically, children with Down syndrome have been found to be delayed in their ability to process visual information, to develop complex voice features, cross modal referencing, and developing recognition memory (Cicchetti & Ganiban, 1990; p.179). Beeghly & Cicchetti (1987) found that children with Down syndrome have similar but delayed conceptions of self and other development. Varnhagen, Das and Varnhagen (1987) reported that children with Down syndrome were particularly deficient in auditory sequential processing and auditory memory, difficulties which manifest themselves in poor language comprehension and production and poor performance on tasks requiring verbal memory and verbal problem solving. These difficulties are felt to stem from a slow long term memory access for lexical information (Varnhagen, Das and Varnhagen, 1987; p.404). As a group children with Down syndrome have problems in attending, discriminating, encoding, transforming and transmitting complex or subtle stimuli.

Language development is slower than in normally developing children, but not different. However language development tends to slow down with age in children with Down syndrome and few manage to use complex forms of language and abstract thinking. Young children with Down syndrome manifest substantial verbal language deficits in comparison to their level of cognitive development (Beeghly, Weiss-Perry & Cicchetti, 1990).

To conclude, children with Down syndrome as a group, have particular difficulty with language (Gibson, 1978), visual monitoring (Kopp,

1983), and abstract reasoning. They have relative strengths in visual motor integration (Gallagher, 1987), and social aspects of cognitive tasks e.g. the pragmatics of language (Beeghly & Cicchetti, 1987).

The Relationship Between Emotional and Cognitive Development In Children With Down Syndrome

Could a lag in emotional development be indicative of possible delays in cognitive and perceptual development? "The disequilibrium that Piaget (1950,1981) and Cicchetti and Pogge-Hesse (1981) propose as a motivator of cognitive advancement seems to be an emotional state" (Campos et al, 1983; p.816). A child's cognitive abilities affect relationships with peers, and social and non social behavior (Flavell,1992). Emotional communication through facial and other channels can mediate the learning process crucial for survival. Campos and colleagues (1983) suggest that from infancy certain basic skills and behaviors are learned by observing the caregivers emotional communications, e.g. avoiding hot stoves/drinks, developing a fear of heights. Bower's experiments at Stanford in the early 1980s (see Case, 1985) illustrated how emotional states influenced the cognitive processes of free association, semantic elaboration, interpretation of imaginative stories, selective learning and certain perceptual effects.

Cicchetti and Beeghly (1990) discussed some compelling evidence for the link between affect (emotional development) and cognition in children with Down syndrome. One noteworthy finding was that early laughter in babies with Down syndrome was a better predictor of later cognitive development than early level of cognitive development. Babies who had laughed before ten months had higher developmental quotients on the Bayley scales of infant development than

babies who laughed later. "In other words, affect predicted cognition better than cognition predicted cognition" (Cicchetti and Beeghly, 1990, p.44).

In considering studies of the play of children with Down syndrome, (Beeghly, Weiss-Perry & Cicchetti, 1990; Mottti, Cicchetti & Sroufe, 1983; and Cicchetti & Sroufe, 1976, 1978) additional support for the strong relationship between cognitive and affective development in children with Down syndrome is reported.

To conclude, emotional and cognitive development are separate systems but from studies showing that affective behaviors in Down syndrome infants can predict later cognitive development these two systems are seen to be closely related. Cicchetti and Beeghly (1990) suggest that the nature of this relationship is interactionary during infancy but that it may change during later stages of development.

Facial Expressions And Emotional Development

Research on facial expressions has influenced the re-emerging interest in emotional development which is reflected in the research literature of the last ten years."The movements of expression give vividness and energy to our spoken words. They reveal the thoughts and intentions of others more truly than do words, which may be falsified" (Darwin, 1872; p.364). There is now felt to be conclusive evidence that certain basic human emotions have universally recognisable facial expressions (Oster, Hegley & Nagel, 1992).

Facial expressions are one of the most immediate sources of information about our peers. Research data over the past twenty years indicates that happy expressions are discriminated earliest and sadness follows later.

"However, beyond documenting the sequence, little is known about the process underlying the development of the ability to discriminate various expressions" (Walden & Field, 1982; p.1312). In infancy facial expressions are the primary index of emotion because of a lack of verbal ability.

Bretherton and colleagues (1986) describe facial expressions as 'emotional signals' which allow organisation of personal and interpersonal life and of development itself. Some emotions can be recognised from changes in facial patterning even in the absence of contextual information (Campos et al, 1983; p.787).

There is some controversy in the research literature as to whether the appearance of universal facial expressions and the subjective feeling state accompanying them are invariant throughout life (Izard, 1977, 1990; Izard & Malatesta, 1987); or whether facial expressions and experience of the basic emotions gradually develop from less finely differentiated precursors (Oster, Hegley & Nagel, 1992; p.1116).

What is known is that from infancy humans can show different facial expressions with differing amounts of intensity which correlate with negative and positive behavioral responses to changes in the environment. The ability to express and recognize emotional states through facial expressions is a developmental phenomenon.

The work of Holder and Kirkpatrick (1991) confirmed the findings of earlier comparative studies which suggested that "children with learning disabilities are less accurate in interpreting facial expressions, than children without learning disabilities (Axelrod,1982; Bachara, 1976; Bryan, 1977; Thomas,

1979)" (Holder and Kirkpatrick, 1991; p.170). Are such differences due to discrepancies between developmental and chronological age?

Summary Of Review & Rationale For The Present Study

Regardless of intellectual ability the early years at school are concerned with basic learning skills and the development of social behaviors and the formation of relationships. The perception of emotional expressions in another has crucial significance for determining pro- social behavior. If you have not seen the precipitating event or have not been told the feelings of the other person then it is important that you can interpret a facial expression. Various qualitative and quantitative differences exist in the developmental process of children with and without Down syndrome matched on MA. Is it possible that the ability to recognise and interpret facial expressions of basic emotions is one such difference? If this is found to be so then there are important implications for early social skills training of young children with Down syndrome. However, taken from another angle, if this ability to recognise and interpret facial expressions is closely linked with the level of cognitive development, then perhaps children with Down syndrome will always have difficulty in interpreting facial expressions, regardless of their chronological age. Ganiban, Wagner & Cicchetti (1990) suggested that "Infants with Down syndrome may need to rely more upon their ability to interpret the simpler unchanging characteristics of objects in their environment, rather than the more abstract cues provided by their mother's facial expressions and reactions" (p.81). If this is the case then the children with Down syndrome in the study might be expected to pay more attention to the context of the photograph rather than the facial expression of the child. In addition this would perhaps result in higher scores

on the in context photographs than on the out of context ones.

There is a lack of data available on the understanding of other children's feelings as expressed by facial expressions by young children with Down syndrome. Yet such information would be useful when considering integration of these children.

Research Questions And Hypotheses

The hypotheses tested were:

(a)That there is a difference between the groups of children matched on MA and on CA in their ability to discriminate between happy and sad facial expressions.

(b) That differences will exist between children with and without Down Syndrome.

(c) That differences will occur between scores on the in context and out of context photographs.

(d) That there will be no difference in ability based on gender.

The children's justification of their judgements should provide useful insight into the children's reasoning.

CHAPTER 3. METHODOLOGY

Subjects

Sixty-one children aged between 24 and 124 months served as the subjects in this study. Five groups were formed from the sixty one children. Group one consisted of seventeen children without Down Syndrome between the ages of 77 and 124 months. Group two consisted of eleven children without Down Syndrome between the ages of 63 and 76 months. Groups three was a group of seventeen children with Down Syndrome whose ages were between 77 and 124 months. Group four consisted of ten young children without Down Syndrome between the ages of 24 and 56 months. Finally group five was a small group of six developmentally delayed children between 80 and 110 months old. Table 1 gives a description of the mean ages of the groups and mean scores on the Peabody Picture Vocabulary Test (PPVT).

Subjects were recruited from Elementary schools, Preschools and Daycares in Edmonton. Parental consent was obtained by letter. The schools etc. served neighborhoods of different socioeconomic backgrounds in various parts of the city. Edmonton school boards identified schools which ran programs for children with Down syndrome either in an integrated or segregated setting. CA matched children were obtained, wherever possible, from the same class as the children with Down syndrome. MA matched children were originally planned as Group 2 from the same schools as the children with Down syndrome, however the PPVT scores obtained from the children with Down syndrome necessitated forming an MA matched group (Group 4) from a younger age group found in preschools and daycares. Random selection of children for Group 3 was not

Table 1: Description of Population

Group	N	Mean Age (months)	SD	Mean MA (PPVT)	SD	Male	Fem.
1 Older children (CA match)	17	96.35	16.36	102.88	19.9	9	8
2 Younger children	11	68.09	3.94	66.36	9.22	6	5
3 Children with Down Syndrome	17	98.00	14.77	39.77	13.52	13	4
4 Very young children (MA match)	10	34.00	11.44	40.4	17.17	3	7
5 Children with developmental delay	6	94.17	11.99	65.33	18.68	4	2

possible owing to the small size of the population.

Materials

Photographs

The two photograph tests consisted of colour photographs (5x7 inches) of children in everyday situations. The children in the photographs were aged between 18 and 96 months. The photographs were of the researcher's own children and relations and were chosen from a bank of thirty two, with sixteen for each category, i.e. In and Out of context, and equal numbers of happy and sad pictures. Interrator reliability was provided by six adult volunteer graduate students choosing ten photographs in each category (five happy and five sad). For each category five happy and five sad photographs were selected on the basis of having been universally identified as happy or sad by the adults. Many studies in this area have used photographs of adults, mostly actors, posing the expressions for the children to identify (Russell & Bullock, 1986). However, it seemed both more useful and natural for the children to have to sort photographs of other children taken in real life situations rather than posed pictures of adults. There is also some question as to whether children, like most people, can tell the difference between real expressions and posed ones (Darwin, 1872). Copies of the photographs can be found in the appendix.

Peabody Picture Vocabulary Test -Revised (PPVT-R)

The children were given the PPVT-R form M to provide a quick estimate of their mental age based on the age equivalent scores of the PPVT-R. This test is a measure of receptive language rather than a comprehensive measure of mental ability but it is a well established and well regarded research tool. The

PPVT-R is felt to be particularly useful for preschool children as it is easy to administer to young immature children. It requires no reading or writing skills. The researcher also felt that it would be a good test for use with the children with Down syndrome as the illustrations are free of fine detail and figure-ground confusion which may impede performance of people with visual-perceptual impairments (Umberger, 1985). In view of the young age of some of the subjects it was also felt to be important to use a test that is fairly quick to administer, in this case 10-20 minutes. Reviewers of the PPVT-R have found it to satisfy criteria for reliability and validity (Umberger, 1985; McCallum, 1985; & Wiig, 1985). The mean reliability coefficients established for the PPVT-R for internal consistency are in the range .61 to .86 for Form M and retest alternate forms reliability is in the range .73 to .91 (Umberger, 1985).

Procedure

The researcher familiarized herself with the children in their normal classroom setting and was introduced to the children by their class teacher. Children were then asked whether they would like to play a game with the researcher. All but one child agreed, and that particular child did not take part in the study. The researcher and child then left the room and went to a quiet room (usually the medical room or library). The children were each given an animal sticker and familiarized with the desk microphone and tape recorder. The order of tasks was explained to them. After completing the PPVT-R the children were asked "Can you show me a happy face?" and "Can you show me a sad face?" All children produced fairly stereotypic faces for the two emotions i.e. big smiles and grins for happy, and mouth turned down and mimicked crying for sad. The children were asked if they

or sad so that we could sort them out into two piles. Research by Ridgeway, Waters and Kuczaj (1985) has shown that the emotion descriptive adjective of 'happy' was known by 90% of 24 month old children and 100% of 36 month old children; 'sad' was known by 63% of 24 month old children and 97% of 36 month old children. This information plus the child's response to "Can you show me a happy face?" etc. made the researcher confident that the child was familiar with the terms being used.

The two sets of photographs (In and Out of context) were laminated on card. The In context photographs on green card and the Out of context photographs on red card. Random order of presentation of task was obtained by the child selecting the set of cards they wished to start with by colour.Random presentation of photographs was obtained by shuffling the cards for each child. The children were prompted by the researcher by being asked "How does that boy/ girl feel?" and then asked "How do you know?" or "How can you tell?" The children's responses were audiotaped.

Research Design and Data Analysis

The study was of quasi experimental static group design. Random selection was not possible due to the small size of the population of children with Down syndrome.

The five sub groups of children made it possible to compare the children with Down syndrome (group 3) with a matched CA group of children without Down syndrome (group 1), a slightly younger group of children without Down syndrome (group 2), and an MA matched group of children without Down syndrome (group 4). One of the schools in the study had provided six

developmentally delayed children who were classmates of two children with Down syndrome. This group of children (group 5) provided an additional comparison group which had not been anticipated in the original design of the study. Group comparison was at four levels. Marfo and Kysela (1988) emphasize the findings of recent research which state that children with intellectual challenges do not function at the same level as typically developing children of comparable chronological age. To obtain meaningful results it was necessary to address the variable of the child's overall level of mental development through the results of the PPVT. Thus an MA matched group (group 4) was formed. Analyses of variance were carried out and also post hoc analyses of means using the Scheffe F-test. A significant effect was considered to have occurred with an alpha=.05.

The responses and justifications of the children to the sorting tasks were audiotaped and transcribed. Six categories of response were formed from the transcripts as a whole (see page 30). The responses were then coded so that comparisons could be made between the groups of the types of justifications and frequency could be seen.The researcher and one other independent adult coded the responses. In addition both coders repeated their work with a sample of the responses. In this way stronger reliability and validity was obtained than would have occurred with a single person coding the responses on only one occasion. In this case reliabilities of over 90% for each category were obtained.

CHAPTER 4. RESULTS

Results were analyzed for the five groups of children across the two tasks conditions. In the following chapter the results will be presented to address the research questions and hypotheses stated in Chapter 2.

The first hypothesis was that there is a difference between the groups of children matched on MA and CA in their ability to discriminate between happy and sad facial expression demonstrated by their scores on the sorting tasks.The scores for the two sorting tasks were combined to detect any significant difference in the children's ability to discriminate between happy and sad facial expressions. A significant difference was found ($F(4,56) = 15.746$ $p<.0001$) between the five Groups. The scores for the five groups were then considered independently for each task. A significant difference for the five Groups in the children's ability to distinguish across happy and sad facial expressions was found on the in context photographs ($F(4,56) = 15.49$ $p<.0001$). A significant difference was also found in the children's ability to distinguish between happy and sad facial expressions on the out of context photographs ($F(4,56) = 9.08$ $p<.0001$). Table 2 gives the means and standard deviations by Group on the sorting tasks.Tables 3, 4 and 5 show the results of the Scheffe F-test for combined and independent scores and reports the between group differences which are significant at 95%. To address the hypothesis that context will make a difference it was seen that the Groups of children did not perform significantly better or worse on either type of sorting task.

Group 3, the children with Down syndrome performed significantly lower on both tasks. This finding supports the hypothesis that a difference in performance will exist between children with and without Down Syndrome, i.e.

the presence of Down syndrome will make a difference. The results showed that they were most similar to the group of very young children, Group 4. Somewhat surprisingly, the small group of developmentally delayed children, Group 5, did not show significant differences in their performance from Groups 1 and 2.

Unfortunately is was not possible to obtain even numbers of males and females in this study, the final sample as a whole consisted of 35 males and 26 females. In addition the numbers of males and females in each group were very uneven, e.g. Group 3 had 13 males and only 4 females. A two way ANOVA looking between groups by gender on each of the two sorting tasks was performed. The results did not reveal a significant difference on the In Context task ($F(4,51) = 1.127$ $p<.3544$) or on the Out of Context task ($F(4,51) = .123$ $p<.9737$). However these results will be affected by the uneven numbers and are not reliable. Thus the hypothesis that there will be no difference in ability based on gender cannot, with confidence, be refuted or supported.

For the justifications the researcher became familiar with the types of responses from the children during both data collection and transcription of the audio tapes. (Transcriptions of the audiotapes can be found in the Appendix.) The interpretation of this data required qualitative analysis. Categories were formed to enable the researcher to cluster similar responses for each of the five groups of subjects. In this way some kind of pattern could be looked for from among the 1000 or so responses. Six categories were developed for the coding process. These categories comprised:-

1) Face - general (FG), this category included statements such as "He has a happy face", "I can tell by her face".

2) Face - specific (FS), this category included statements such as "She's smiling", "He has a frown", "He is laughing".

3) Emotional state label (E), in many ways this is not a justification. The child may have simply been sorting the picture aloud. On the other hand "happy" and "sad" could be being used as descriptions of the emotional state of the person in the photograph. Statements in this category were usually one word utterances, "happy" "sad".

4) Don't know (DK), the child said that he or she did not know or could not tell.

5) Descriptive of context or situation (D), the child described what the person in the photograph was doing or what they could see in the photograph. Statements such as "He has paint on his face" and "She is in the bath" occurred here.

6) Inferential (real or imagined), (I), the child's response is based on events not necessarily depicted in the photograph, e.g. "She is sad because her dog just died", "I think she is happy because she has a new mother", "He is happy because it looks like a class picture".

Inter coder agreement using the formula of Miles & Huberman (1984) with reliability equalling the number of agreements divided by the total number of agreements and disagreements gave reliabilities of over 90% for each category.

Table 2: Mean Scores and Standard Deviations by Group on Sorting Tasks

Group/Scores	Mean	SD
1 Older Children (CA match)		
Combined scores	19.88	.33
In Context	9.94	.24
Out of Context	9.94	.24
2 Younger children		
Combined scores	19	1.1
In Context	9.64	.67
Out of Context	9.36	1.03
3 Children with Down syndrome		
Combined Scores	14.35	3.55
In Context	7.06	1.68
Out of Context	7.29	2.31
4 Very young children (MA match)		
Combined scores	15.3	3.40
In Context	7.7	2.00
Out of Context	7.6	1.9
5 Developmentally delayed children		
Combined scores	19.5	.55
In Context	9.67	.52
Out of Context	9.83	.41

Table3: Results of Scheffe F-Test On Combined Scores

Comparison	Scheffe F-Test	Significant at 95%
1 vs 2 (Older vs Younger)	.227	No
1 vs 3 (Older vs Children with DS)	11.326	Yes
1 vs 4 (Older vs very young)	5.762	Yes
1 vs 5 (Older vs children with developmental delay)	.028	No
2 vs 3 (Younger vs children with DS)	6.285	Yes
2 vs 4 (Younger vs very young)	3.125	Yes
2 vs 5 (Younger vs children with developmental delay)	.042	No
3 vs 4 (Children with DS vs very young)	.246	No
3 vs 5 Children with DS vs children with developmental delay)	5.12	Yes
4 vs 5 Very young vs children with developmental delay)	2.883	Yes

Table 4:Results of Scheffe F-Test - In Context Scores

Comparison	Scheffe F-Test	Significant at 95%
1 vs 2 (Older vs Younger)	.1	No
1 vs 3 (Older vs children with DS)	11.25	Yes
1 vs 4 (Older vs very young)	5.04	Yes
1 vs 5 (Older vs children with developmental delay)	.05	No
2 vs 3 (Younger vs children with DS)	7.07	Yes
2 vs 4 (Younger vs very young)	3.13	Yes
2 vs 5 (Younger vs children with developmental delay)	.001	No
3 vs 4 (Children with DS vs very young)	.41	No
3 vs 5 (Children with DS vs children with developmental delay)	4.81	Yes
4 vs 5 (Very young vs children with developmental delay)	2.31	No

Table 5: Results of Scheffe F- Test Out of Context Scores

Comparison	Scheffe F-Test	Significant at 95%
1 vs 2 (Older vs younger)	.24	No
1 vs 3 (Older vs children with DS)	6.4	Yes
1 vs 4 (Older vs very young)	3.71	Yes
1 vs 5 (Older vs children with developmental delay)	.01	No
2 vs 3 (Younger vs children with DS)	3.07	Yes
2 vs 4 (Younger vs very young)	1.75	No
2 vs 5 (Younger vs children with developmental delay)	.09	No
3 vs 4 (Children with DS vs very young)	.06	No
3 vs 5 (Children with DS vs children with developmental delay)	3.07	Yes
4 vs 5 (Very young vs children with developmental delay)	2.01	No

The scores in each category for each group were recorded by both coders and the reliability formula applied. The results are given in table 6.

Table 7 shows the percentage of responses in each category for each group in order of frequency. The older children in group 1 used the naming (E) and facial specific (FS) categories to a very similar extent. However the other children, with the exception of the small group of developmentally delayed children (Group 5), use the naming category (E) for about half of all their responses. The developmentally delayed children, interestingly, are most like the group of older children (Group 1) with whom they are a close CA match.

The developmentally delayed children gave inferential responses to a far greater extent than any of the other groups and used the naming category very little. The results from this part of the study gave far more information than had been expected and helped the researcher to hypothesize the underlying reasons for the differences in the sorting task. Figures 1 and 2 illustrate the differences in response both by group and category. In Figure 1 it is possible to see that the three most popular responses were Facial Specific, Emotional label, and Inferred. Figure 2 illustrates apparent similarity between Groups 2, 3 and 4, and also between Groups 1 and 5. However if the category of Emotional label is seen as a form of self talk during the sorting task then it is possible to see that Group 2 is more like Groups 1 and 5 but Groups 3 and 4, the children with Down syndrome and the very young children, are similar.

In summary the results answered the research hypotheses and questions as follows; there is a difference in children's ability to discriminate across happy and sad facial expressions by the Groups in this study. The results of

the group of children with Down syndrome differed significantly from all but the MA match group of very young children (Group 4). This finding indicates that it may be mental age and not the presence of Down syndrome that made the difference. However when the distribution of children's responses was examined quantitatively it was observed that the children with Down syndrome used more inferential and descriptive justifications than the MA match group. The children with Down syndrome were seen to have performed at quantitatively the same level as the MA match group but were qualitatively different in their responses. A discussion of these results and their implications follow in the next chapter.

Table 6: Distribution of Responses in Each Category by Group Recorded by Both Coders

Group	FG	FS	E	DK	D	I	% Reliability
1 Older CA match	23/354 32/353	129/354 136/353	111/354 103/353	1/354 0/353	17/354 16/353	73/354 66/353	91
2 Younger	10/224 11/225	37/224 39/225	124/224 121/225	0/224 1/225	3/224 3/225	50/224 50/225	96
3 DS	26/348 29/336	60/348 63/336	167/348 167/336	2/348 1/336	47/348 46/336	46/348 30/336	93
4 Very Young MA match	16/181 17/181	44/181 43/181	103/181 109/181	4/181 4/181	12/181 4/181	2/181 4/181	91
5 Dvp. Delay	19/123 20/123	38/123 40/123	10/123 12/123	4/123 0/123	9/123 9/123	43/123 42/123	92

FS....Facial Specific

FG....Facial General

E.....Emotion Label

D.....Descriptive

I.....Inferred

DK.....Don't Know

Table 7:% of Responses in Each Category by Group in Order of Frequency

Group	1	2	3	4	5	6
1(Older)	FS	E	I	FG	D	DK
%	37.482	30.269	19.661	7.779	4.668	.141
2 (Younger)	E	I	FS	FG	D	DK
%	54.566	22.272	16.927	4.677	1.336	.223
3 (Down Syndrome)	E	FS	D	I	FG	DK
%	48.830	17.982	13.597	11.111	8.041	.439
4 (Very young)	E	FS	FG	D	DK	I
%	58.564	24.033	9.116	4.5	2.21	1.658
5 (Dvp. Delay)	I	FS	FG	E	D	DK
%	34.553	31.707	15.854	8.943	7.317	1.626

FG.. Facial General

FS...Facial Specific

E. ....Emotion Label

D..... Descriptive

I..... Inferred

DK... Don't Know

Figure 1: Distribution of Responses by Group

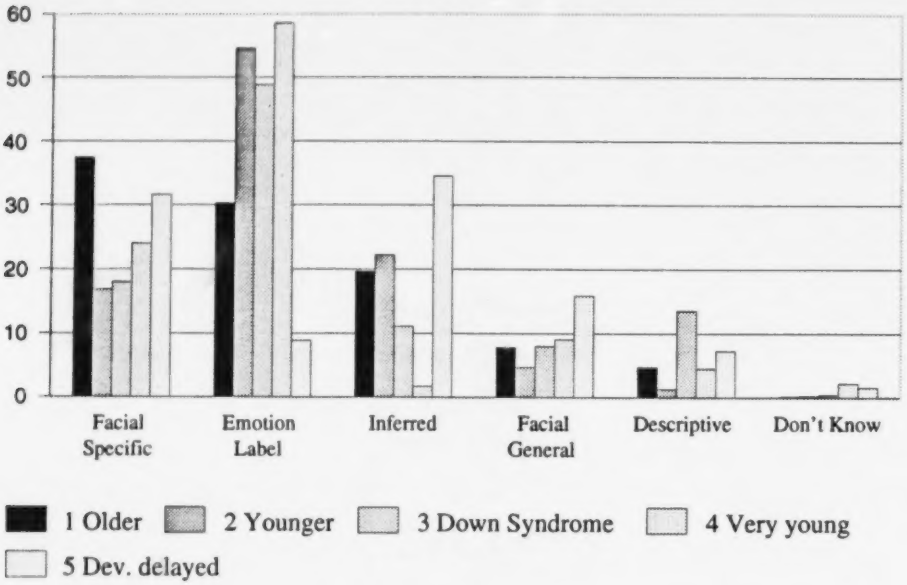
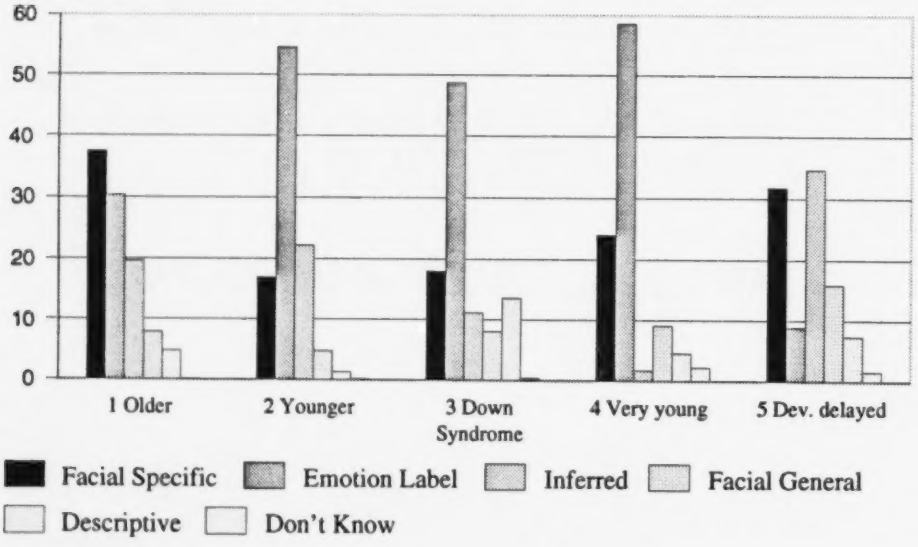


Figure 2: Distribution of Responses by Category



CHAPTER 5. DISCUSSION

This chapter will discuss possible hypotheses for the differing performances of the groups of children and also the differing responses of the children during the sorting tasks. Two areas guide the discussion, the sociological and the physiological possibilities for the results. The importance of social perception is discussed and implications for future research are given.

Sociological Interpretation

The children with Down syndrome in this study performed at the same level as the MA matched group and not at the same level as the CA matched group on the sorting tasks. It has been suggested by Ekman (1973) that many social experiences are necessary before a child develops the ability to recognise and interpret the expressive behavior of others. However, the children with Down syndrome in this study had had more experiences socially than the younger children. Many of the Down syndrome group were integrated into regular classrooms and those in segregated classes were in segregated classes in regular schools sharing recess times with other children. It is therefore unlikely that the poor performance of the children with Down syndrome was due to their not having received enough exposure to other children.

It is possible that the use of static photographs was not sufficiently arousing for the younger children and the children with Down Syndrome. Denham (1986) suggested that a child's response to a scenario involving other children will not necessarily be identical to their own response in a similar situation. Darwin (1872) was one of the first researchers to employ photographs to assess the ability of adults to recognize facial expressions. It is possible that the children mentioned

above did not find the photographs as meaningful as they would real life situations depicted through video tape or play situations.

Murray--Thomas (1985) suggested that up until about age 5 a child centers her or his attention chiefly on a few features on which to base a decision and may overlook other features that would contribute to a more accurate judgement about the significance of the observation. Hence in the young child we may see a certain absence of co- ordination between all the cues the child is capable of perceiving and the rules the child is capable of using. In such a way the children with Down syndrome in the study may have seen the picture of the girl in the bath crying, noted that she was crying but they themselves view having a bath as a happy experience, being unable to reconcile both cues and look at the other child's perspective, they made a judgement based on their own experience rather than what they saw.

Early research by Honkavaara (cited in Ekman, 1973) suggested that 50% of 3 to 4 year old children mistakenly identified a sad girl in a red dress as happy. Honkavaara concluded that the children in the study were being influenced by external variables - clothing, situation etc. In addition, younger children may pay attention to events that older children, because of their greater experience, ignore. However, although this was expected in the present study, the results of the sorting tasks did not reveal a significant difference between scores for in and out of context. The children performed at the same level on the sorting tasks irrespective of whether the child in the picture was shown face only or engaged in a play activity. During data collection it was noted that the children with Down syndrome would state that the child in the picture was crying but then sort the picture as

happy often saying "happy" with confidence as they placed the picture on the table. From their responses it would appear that this group of children based their choice of happy or sad far less on the facial appearance of the children in the photographs than the other groups of children.

Did the children with Down syndrome know what was required of them? They co operated in sorting the photographs and they had demonstrated their understanding of the terms "happy" and "sad" by producing appropriate facial expressions.

The responses of the children with Down syndrome and their MA matched group (Group 4) were most frequently in the naming category. This is not very helpful in determining what they were looking at in the picture to help them decide. Perhaps it can be regarded more in the light of 'self-talk' guiding the children through the sorting task.

The group of developmentally delayed children (Group5) is too small to be able to do more than note interesting aspects of their performance. However, the results were so different from those that the researcher expected they deserve some discussion here. The scores of the children in Group 5 on the sorting tasks were not significantly different from their CA matched peers (Group 1) yet their responses were of a very different pattern than any of the other groups. This group of children, although appearing much less socially adept than the children with Down syndrome during conversation, were in fact much more able to judge correctly the facial expressions of the children in the photographs. In addition they seemed to use information from their own experiences to help them make up their minds. For example they gave far more inferential responses than the other groups

of children and were forthcoming in suggesting possible reasons why the boys and girls in the photographs might be happy or sad. Such inferential responses illustrated that these children had a causal understanding of emotion. This group, and to a lesser extent the two groups of older children (Groups 1 and 2), were seen to be referring to possible "intervening mental states that mediate between the situation and the emotion aroused" (Gnepp, 1983, p.805).

One question that should be considered is just what is it that children with Down syndrome and the very young children in this study have in common? Perhaps it is that in general we place limited expectations of performance in social situations on these children. At age two, parents are still providing a lot of modelling for their children in social situations. It is not expected that these children will instinctively know how others are feeling. Parents point out expressions and connected emotions to their children at this young age, e.g. "look he's crying, he's sad" or "what a happy smile". In the same way when dealing with children with Down syndrome perhaps, unconsciously, we carry on guiding these children through social situations at much later ages than we would with other children. Therefore they do not need to know how to tell if someone is happy. It has been noted that children with Down syndrome do not often initiate play (Beeghly, Weiss-Perry & Cicchetti, 1990). It is also possible that due to dampened affect, poor parental referencing and low levels of joint attention during object play and social interaction (Beeghly et al. 1990) children with Down syndrome are less often rewarded, or noticed, when giving correct unsolicited responses in social situations. A lack of reinforcement for the child's own judgments may make her/ him more reliant on the judgements of others. In the class, teachers, aides and

other children actively include them in activities. Yet the ability to recognise and interpret correctly the facial expression of peers should be facilitative of peer acceptance, reciprocal social interaction and self acceptance. It is highly desirable that children with Down syndrome be able to develop appropriate social skills so that in later life they will be able to interact socially with their peers. Once children with Down syndrome reach adolescence then people are not always so willing to guide them through social situations nor is it appropriate that they should. This can be a time of great frustration for young people with Down syndrome who seem to be suddenly given the message "grow up" but do not have the necessary skills to function at an equal social level as their peers.

It could be argued that although this study seems to show an important discrepancy in the field of recognition of facial expression between children with and without Down syndrome of the same chronological age, how important is this in their social development? It is possible that in social interactions there are many complex and varied stimuli on which judgements are made and therefore facial expressions are not of crucial importance for the young child in determining the emotional/affective state of another person. But whatever information the children in the study were using to make their decision the younger children and the children with Down syndrome were making wrong decisions for a significant proportion of the time.

Physiological Interpretation

In this section, the possibility that the difference in performance observed in the children with Down syndrome could be attributed to the presence of Down syndrome and the effect that this has on neurological and cognitive

functioning will be discussed. Existing research into deficits in facial recognition will be reviewed.

Could there be a fundamental problem in processing the information for young children and children with Down syndrome alike? A facial expression provides others with an opportunity for emotional appraisal based on perceptual and cognitive input. Studies of brain injured patients such as that by Kurucz, Feldmar & Werner (1979) have found that these brain injured patients can no longer interpret facial expressions. Autistic children have been shown to have difficulty in recognizing facial expressions (Tantum, Monaghan, Nicholson & Stirling; 1989). These researchers found that there is strong evidence that at least some autistic children have a specific difficulty in using photographs to attribute emotion to faces. Girls with Turner syndrome show a weakness in their ability to discriminate facial affect (McCauley, Kay, Ito & Treder; 1987).

Little is known of the neural bases of the recognition of facial expression, although Kolb, Wilson and Taylor (1992) cite several studies which have shown that damage to the right hemisphere results in an impairment in matching facial expressions in different people. There is also evidence of impaired face-expression recognition after frontal lobe injury. The right hemisphere is believed to be dominant for facial perception. The left hemisphere is dominant in processing verbal and sequential stimuli and the right hemisphere in processing and storing visual data, tactile and visual recognition of shapes and forms, perception of spatial orientation and perspective, copying and drawing geometric and representational designs and pictures. Studies of people with right hemisphere damage demonstrate that these people have selective deficits in processing both

affect and faces (Benton, 1980; Dekosky, Heilman, Bowers & Valernstein; 1980).

The study by Kolb and colleagues found an improvement in perception of facial expression up until about fourteen years of age. A developmental change occurs at around eight years of age and another at around fourteen. The same researchers attributed the poorer ability of young children in facial perception to a general difficulty in facial processing. This finding, they postulate, may be due to the immature functioning of the frontal lobes, which mature relatively late at around seven years of age (Luria, 1966; Huttenlocher, 1979). Is it possible then that the apparent developmental changes in the children's performance seen in this study reflect changes in cortical development? This may be true for the younger children of Group four but is there any reason to suppose that cortical development in children with Down syndrome is delayed?

In Kemper's (1988) review of studies on the neuropathology of Down syndrome, decreased number of neurons in the cerebral cortex and hippocampus of individuals with Down syndrome was a consistent finding. Cortical development in Down syndrome is within the normal range up until birth and then there follows a "progressive curtailment of brain development during the first postnatal years" (Kemper, 1988, p.276). This result has been found to correlate with a decline in estimated IQ. Therefore in answer to the question, Yes cortical development is delayed, or rather, quantitatively different in children with Down syndrome.

Visuo-spatial problem solving deficits lead to difficulties in discriminating facial cues and consequently social problems. Perhaps affective discrimination is a complex visual discrimination task mediated by the right hemisphere. Studies have shown evidence of decreased maturation of tissue in the

visual cortex of people with Down syndrome relative to people without Down syndrome of the same age (for a review see Ganiban, Wagner & Cicchetti, 1990). Children with Down syndrome are known to have difficulties in visual information processing.

It may be possible that although the children with Down syndrome had exposure socially to many different facial examples of happy and sad children, they had not managed to encode and store enough images of the various faces for happy and sad. If this were the case then they would perhaps be in the same position as the younger child when trying to match what they see with what they have stored in their long term memory, or perhaps the children with Down syndrome could not access the facial patterns in their long term memory.The classification of an expression requires that the child can categorize all similar patterns together irrespective of the faces making them.

A chromosomal abnormality, such as Down syndrome, may alter brain development because it can lead to deviations from normal hormonal levels and sensitivity (McCauley et al., 1987). Reduced hormonal levels can lead to a failure in right hemisphere development. Discrepancies in hormonal levels in children with and without Down syndrome have been reported in the literature (see Ganiban, Wagner & Cicchetti (1990) for a review).

It is possible that the presence of Down syndrome affects a child's ability to discriminate facial expressions. This may stem from physiological deficits associated with Down syndrome such as poor information processing, particularly visual information processing, delayed cortical development, and reduced hormonal levels.

Social Perception

Just as emotional and cognitive development are closely related, it is possible that the underlying causes of the results of this study are a combination of sociological and physiological factors. What would be the results of a problem in facial recognition of emotions? It could be argued that the children with Down syndrome in the study showed a deficit which would affect their social perception. Social perception involves elaborate cognitive processes of inference and interpretation directed toward discovering the social meaning of the actions of others. Once an incorrect perception of judgement is made, it often acquires a life of its own, guiding further information processing strategies and making correction difficult (Forgas & Bower, 1988).The simple phenomenon of identifying an emotion from looking at a photograph can be labelled social perception. The act of perception imposes structure on the environment, it involves the drawing of inferences and making suppositions about the behavior of others.

Inferential responses such as those supplied by the children of Group 5 and, to a lesser extent, Groups 1 and 2, suggest that a child realizes that one environmental event is related to, or predicts something about another environmental event. This result equates to the construction of "objective relationships" in the sensori motor period of Piaget. However these responses go further than sensori motor information processing as they involve more than just an understanding of the here and now of the other's facial expression (Hill, 1979). Autistic children and girls with Turner syndrome all have problems with social perception and in social skills. It would appear that children with Down syndrome,

although appearing quite socially adept, do not in fact correctly identify basic facial expressions of emotion and therefore would seem likely to make incorrect social judgements.

Limitations of the Study and Implications for Future Research

It would have been interesting to have been able to examine whether the deficits observed in discriminating between happy and sad facial expressions was specific to either emotion, i.e. happy or sad. However the methods of data collection used in the study did not allow such an analysis i.e. specific responses for individual photographs were not recorded. Future research could consider the ability of children with Down syndrome to correctly identify discrete facial expressions of happy and sad, and perhaps include other basic emotions such as anger and fear. Further research could also examine whether the deficit in the discrimination of facial expressions, reported here, extends into adulthood or whether, like the 2 year olds in this study, the children with Down syndrome will get better at discriminating between facial expressions as they get older.

Conclusion

Down syndrome is "the most common cause of mental handicap in developed countries, accounting for around one third of all children with severe handicap.....In the UK, around 1000 babies are born with Down syndrome each year and in the US, about 7000" (Wishart, 1988). The ultimate aim of parents and other professionals dealing with these children is for them to function as full members of society with the greatest amount of independence possible.

Cognitive development has been shown to be facilitated by social interaction (Serafica, 1990), and similarly, social development is affected by

cognitive ability. If children with Down syndrome have difficulty in discriminating basic emotions from facial expressions then how do they cope with more complex expressions of emotion such as shame, contempt and fear? "The classification of facial expressions is a necessary pre requisite for the inference of emotion" (Bruce, 1988). If further research supported this initial evidence that children with Down syndrome have difficulties in discriminating between facial expressions it would appear that some basic social skills training and modelling is required by these children at later ages than with children without Down syndrome. If it can be argued that despite this difficulty children with Down syndrome are seen to be interacting appropriately in the class and in other social situations, then how are they compensating for this deficit? Upon what information do they make their social perception/interaction judgements?

This has proved to be a most interesting area of study. Whilst this research has indicated a possible difference between children with and without Down syndrome it has not delivered an explanation, only possible hypotheses. To function fully in society the person with Down syndrome must be socially competent, have the ability to form relationships and to interpret the intentions and actions of others. Addressing this issue at a young age is important. Perhaps early intervention, pre school and elementary school programs have presupposed a social competency that does not appear to be supported by the data in this study:- namely, that children with Down syndrome, unlike their CA peers, can not consistently discriminate between the basic facial expressions of happy and sad when presented with photographs of unfamiliar children, and that this may be indicative of immaturity in the domain of social competence.

References

Asendorpf, J.B. & Baudonniere,P.M. (1993). Self-awareness and other-awareness: Mirror self-recognition and synchronic imitation among unfamiliar peers. Developmental Psychology, 29 (1) 88-95.

Axelrod, L. (1982). Social perception in learning disabled adolescents Journal Of Learning Disability, 15, 610-613.

Bachara, G.H. (1976). Empathy in learning disabled children. Perceptual and Motor Skills,43, 541-542.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, New Jersey: Prentice Hall.

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, New Jersey: Prentice Hall.

Beeghly, M. & Cicchetti, D. (1987). An organizational approach to symbolic development in children with Down Syndrome. New Directions For Child Development, 36 5-29.

Beeghly, M., Weiss-Perry, B. & Cicchetti, D. (1990). Beyond sensori motor functioning: early communicative and play development of children with Down syndrome. In Cicchetti, D. & Beeghly, M (Eds.) (1990). Children with Down syndrome: A developmental perspective. Cambridge University Press: New York.

Benton, A.L. (1980). The neuropsychology of facial recognition American Psychologist,35 176-186.

Borke, H. (1971). Interpersonal perception of young children Developmental Psychology, 5, (2) 263-269.

Bretherton,I. & Beeghly, M. (1982). Talking about internal states: The acquisition of an explicit theory of mind. Developmental Psychology,18, 906-921.

Bretherton, I., Fritz, J., Zahn-Waxler, C. & Ridgeway, D. (1986). Learning to talk about emotions: A functionalist perspective. Child Development, 57 529-548.

Bretherton, I., McNew, S. & Beeghly-Smith,M.(1981). Early person knowledge as expressed in gestural and verbal communication. In Lamb, M. & Sherrod, L. (Eds.) Social cognition. New Jersey: Erlbaum

Brown, A.L. & Campione, J.C. (1986). Psychological theory and the study of learning disabilities. American Psychologist, 41, 1059-1068.

Bruce, V. (1988). Recognising faces. London (UK): Erlbaum

Bryan, T.H. (1977). Learning disabled children's comprehension of non verbal communication. Journal of learning Disabilities, 10, 501-506.

Bullock, M. & Russell, J.A. (1984). Preschool children's interpretation of facial expressions of emotion. International Journal Of Behavior Development, 7,193-214.

Bullock, M. & Russell, J.A. (1985). Further evidence on preschoolers' interpretation of facial expressions. International Journal Of Behavioral Development, 8, 15-38.

Campos,J.J., Barrett, K.C., Lamb, M.E., Goldsmith, H.H., & Stenberg, C. (1983). Socioemotional development. In Haith, M. & Campos, J.J. (Eds.) Handbook of child psychology.2, 783-915, New York:Wiley.

Campos, J.J., Campos, R.G. & Barrett, K.C. (1989). Emergent themes in the study of emotional development and emotion regulation. Developmental

Psychology,25, (3), 394-402.

Camras, L.A. & Allison, K. (1985). Children's understanding of emotional facial expressions and verbal labels. Journal Of Non Verbal Behavior, 9 (2) 84-94

Casey, R. (1993). Children's emotional experience: relations among expression, self-report, and understanding. Developmental Psychology,29,(1) 119-129.

Case, R. (1985). Intellectual development birth to adulthood. Toronto: Academic Press.

Chapman, M. (1989). Cognitive competence and verbal explanations in studies of children's reasoning. In Chandler, M. & Chapman, M. (organisers) The question of early competence: Controversy in the assessment of children's abilities. Symposium presented at the meeting of the Society for Research in Child Development, Kansas City, April 1989.

Cicchetti, D. & Beeghly, M. (Eds.)(1990). Children with Down syndrome: A developmental perspective New York: Cambridge University Press.

Cicchetti, D. & Ganiban, J. (1990). The organisation and coherence of developmental processes in infants and children with Down syndrome. In Hodapp, R.M., Burack, J.A. & Zigler, E. Issues In The Developmental Approach To Mental Retardation. New York: Cambridge University Press.

Cicchetti, D. & Sroufe, L.A. (1976). The relationship between affective and cognitive development in Down syndrome infants. Child Development,47, 920-929.

Cicchetti, D. & Sroufe, L.A. (1978). An organisational view of affect:

Illustration from the study of Downs syndrome infants. In Lewis, M. &Rosenblum, L. (Eds.) The development of affect.New York: Plenum Press.

Cicchetti, D., Toth, S.,Bush, M.A.,& Gillespie,J.F. (1988). Stage salient issues in infancy and toddlerhood: Implications for a transactional model of intervention. New Directions For Child Development,39, 123-145.

Darwin. C.(1872). The expression of the emotions in man and animals. London: Murray.

Das, J.P. (1991). A New Look At Human Intelligence. In Short, R.H., Stewin, L.L., & McCann, J.H. (Eds.). Educational psychology: Canadian perspectives. Copp, Clark, Pitman.

Denham, S.A. (1986). Social cognition, prosocial behavior and emotion in preschoolers: Contextual validation.Child Development, 57, 197-201.

Denham,S.A. & Couchoud, E.A. (1990). Young preschoolers' understanding of emotions. Child Study Journal,20, (3), 171-191.

DeKosky, S.T., Heilman, K.M., Valerstein, E. (1980). Recognition and discrimination of emotional faces and pictures. Brain and Language, 9, 206-214.

Dial, M. & Harris,P.L. (1988). The effect of make believe play on deductive reasoning. British Journal of Developmental Psychology, 6 202-221.

Ekman, P.(1973). Darwin and facial expression New York: Academic Press.

Erikson, E.H. (1963). Childhood and society. New York: Norton.

Fisher, M.A. & Zeaman, D. (1970). The growth and decline of retardate intelligence. In Ellis N.R. (Ed.) International review of research in mental retardation.4 New York: Academic Press.

Fischler, K. & Koch, R. (1991). Mental development in Down syndrome mosaicism. American Journal Of Mental Retardation,96, (3), 345-351.

Flavell, J.H. (1992). Cognitive Development: Past, Present and Future. Developmental Psychology, 28 (6) 998-1005.

Forgas, J.P. & Bower, G.H. (1988). Affect in social and personal judgements. In Fiedler, K. & Forgas, J.P. (Eds.) Affect, Cognition and Social Behavior. New York: Hogrefe.

Gallagher, R.J. (1986). Affective expression: Implications for the educator, clinician and therapist. Physical and Occupational Therapy in Pediatrics, 6,(1), 65-74.

Gallagher, T.M. (1991). Pragmatics of language: Clinical practice issues.San Diego Publishing Group.

Ganiban, J., Wagner,S. & Cicchetti, D. (1990). Temperament and Down syndrome. In Cicchetti, D., & Beeghly, M. (Eds.). Children with Down syndrome: A developmental perspective. New York: Cambridge University Press.

Gnepp, J. (1983). Children's social sensitivity: Inferring emotions from conflicting cues. Developmental Psychology,19, (6) 805-814.

Graham, S. & Weiner, B. (1986). From an attributional theory of emotion to developmental psychology: a round trip ticket? Social Cognition, 4 152-179.

Hayward, S. (1986). A developmental study of jealousy - The social triangle and its effects on the developing child.Unpublished Doctoral Dissertation University Of Toronto.

Harris, P.L. (1989). Children and emotion. Oxford: Oxford.

Harris, P.L. (1989). In Saarni, C. & Harris, P.L. Children's understanding of emotion. Cambridge: Cambridge University Press.

Harris,P.L., Johnson,C.N.,Hutton, D. Andrews, G. & Cooke, T. (1989). Young children's theory of mind and emotion

Hesse, P. & Cicchetti, D. (1982). Toward an integrative theory of emotional development. New Directions for Child Development,16, 3-48.

Hill, K.A. (1979). Social perception in childhood. In Chadwick-Jones, J.K., Lenzer, I.I., Darley, J.A. & Hill, K.A. (Eds.) Brain, environment & social psychology. Baltimore: University Park Press.

Holder, H.B. & Kirkpatrick, S.W. (1991). Interpretation of emotion from facial expressions in children with and without learning disabilities. Journal Of Learning Disabilities, 24.(3), 170-177.

Hughes, R., Tingle, B.A. & Sawin, D.B. (1981). Development of empathic understanding in children. Child Development,52,122-128.

Huttenlocher, P.R. (1979).Synaptic density in human frontal cortex - developmental changes and effects of aging.Brain Research,163, 195-205.

Izard, C.E. (1971). The face of emotion.New York: Appleton-Century-Crofts.

Izard, C.E. & Malatesta,C. (1987). Perspectives on emotional development 1: Differential emotions theory of early emotional development. In Orlofsky, J. (Ed.). Handbook of infant development.(2nd edition) New York: Wiley.

Izard, C.E., Heubner, R.,Risser,D.,McGinnes, G. & Dougherty, L. (1980). The young infant's ability to produce discrete emotion expressions.

Developmental Psychology,19,418-426.

Kagan, J. (1981). The second year. The emergence of self-awareness Cambridge: Cambridge University Press.

Kemper, T.L. (1988). The neuropathology of Down syndrome. In Nagel, L. (Ed.). The Psychobiology Of Down Syndrome. Cambridge: MIT Press.

Kohlberg, L. (1969). Stage and sequences: The cognitive-developmental approach to socialisation. In Goslin, D.A. (Ed.) Handbook of socialization: Theory and Research. Chicago: Rand McNally.

Kolb, B.,Wilson, B. &Taylor, L.(1992). Developmental changes in the recognition and comprehension of facial expression: Implications for frontal lobe function. Brain & Cognition, 20,(1), 74-84.

Kopp, C.(1983). Risk Factors In Development. In Mussen, P.H. (Ed.) Handbook of child psychology Vol 2 Infancy and developmental psychobiology New York: Wiley.

Kurucz, J., Feldmar, G.W. & Werner, W. (1979). Prosopo-affective agnosia associated with chronic organic brain syndrome. Journal of the American Geriatric Society, 27, 91-95.

Lewis, M. & Saarni, C. (1985). The socialisation of emotions.New York: Plenum Press.

Luria, A.R. (1966). Higher cortical functions in man. New York: Basic Books.

Marfo, K. & Kysela, G.M. (1988). Frequency and sequential patterns in mothers' interactions with mentally handicapped and nonhandicapped children. In Marfo, K. (Ed.). Parent-child interaction and developmental disabilities.New

York: Praeger.

Michalson, L. & Lewis, M. (1982). Socialisation Of Emotion. In Field, T. & Fogel, A. (Eds.). Emotion and early interaction: Normal and high risk infants. Hillsdale New Jersey: Erlbaum.

McCallum, R.S. (1985). Review of Peabody Picture Vocabulary Test Revised. In Mitchell, J.V. (Ed). Ninth mental measurement yearbook Volume 2. Lincoln, Nebraska: University Of Nebraska.

McCauley, E., Kay, T., Ito, J. & Treder, R. (1987). The Turner syndrome: Cognitive deficits, affective discrimination, and behavior problems. Child Development,58, 464-473.

Motti, F., Cicchetti, D., & Sroufe, L.A. (1983). From infant affect expression to symbolic play: The coherence of development in Down syndrome children. Child Development,54, 1168-1175.

Murray - Thomas, (1985). Comparing theories of child development. (Second Edition) Belmont,Ca.: Wadsworth.

Oster,H., Hegley, D. & Nagel, L. (1992). Adult judgements and fine-grained analysis of infant facial expressions: Testing the validity of a priori coding formulas. Developmental Psychology, 28, (6), 1115-1131.

Piaget, J. (1923). The language and thought of the child. In Gruber, H.E. & Voneche, J.J. (1977). The Essential Piaget.New York: Basic Books.

Piaget, J. (1964). The Early growth of logic in the child. In Gruber, H.E. & Voneche, J.J. (1977). The Essential Piaget.New York: Basic Books.

Reichenbach, L. & Masters, J. (1983). Children's use of expressive and contextural cues in judgement of emotion. Child Development,54 (4) 993-

1004.

Ridgeway, D., Waters, E. & Kuczaj, S.A. (1985). Acquisition of emotion-descriptive language: Receptive and productive vocabulary norms for ages 18 months to 6 years. Developmental Psychology,21,(5), 901-908.

Rothbart, M.K. & Hanson, M.J. (1983). A caregiver report comparison of temperamental characteristics of Downs Syndrome and normal infants. Developmental Psychology,19,766-769.

Russell, J.A. & Ridgeway, D.(1983). Dimensions underlying children's emotion concepts. Developmental Psychology,19, 795-814.

Russell, J.A. & Bullock, M. (1986). On the dimensions pre schoolers use to interpret facial expressions of emotion, Developmental Psychology, 22, (1), 97-102.

Serafica, F.C. (1990). Peer relations of children with Down syndrome. In Cicchetti, D. & Beeghly, M. (Eds.). Children with Down syndrome: A developmental perspective. New York: Cambridge University Press.

Shields, J. (1991). Semantic Pragmatic disorder: A right hemisphere syndrome? British Journal Of Disorders Of Communication,26,383-392.

Strain,P.S. & Odom, S.L. (1986). Peer social interactions: Effective intervention for social skills development of exceptional children. Exceptional Children,52,(6) 543-551.

Tantum, D., Managhan, L., Nicholson, H. & Stirling, J. (1989). Autistic children's ability to interpret faces: A research note. Journal of child psychology and psychiatry, 30, (4), 623-630.

Termine,N.T. & Izard, C.E. (1988). Infants' responses to their

mothers' expressions of joy and sadness. Developmental Psychology, 24, 223-229.

Thompson, O.M. (1985). The nonverbal dilemma. Journal of learning Disabilities,18,400-402.

Thompson, R.A., Cichetti, D., Lamb, M.E. & Malkin, C. (1985). Emotional responses of Down syndrome and normal infants in the strange situation. The organisation of affective behavior in infants. Developmental Psychology, 21,828-841.

Umberger, F.G. (1985). Peabody Picture Vocabulary Test- Revised. In Keyser, D.J. & Sweetland, R.C. (Eds.). Test Critiques. Missouri:Test Corporation Of America.

Varnhagen,C.K., Das, J.P., & Varnhagen,S. (1987). Auditory and visual memory span: Cognitive processing by TMR individuals with Down syndrome or other etiologies. American Journal Of Mental Deficiency, 91, (4), 398-405.

Walden,T.A. & Field,T.M. (1982). Discrimination of facial expressions by preschool children. Child Development,53, 1312-1319.

Wellman, H. & Bartsch, K. (1989). Young children's attribution of actions to beliefs and desires. Child Development, 60, (4), 946-964.

Wiig, E.H. Review of the Peabody Picture Vocabulary Test Revised, In Mitchell, J.V. (Ed) Ninth mental measurement yearbook Volume 2. Lincoln Nebraska: University Of Nebraska Press.

Wishart, J.G. (1988). Early learning in infants and young children with Down syndrome. In Nadel, L. (Ed.). The psychobiology of Down Syndrome. Cambridge: MIT Press.

Zahn-Waxler,C. & Radke-Yarrow,M. (1982). The development of altruism: Alternative research strategies. In Eisenberg (Ed.). The development of prosocial behaviour. New York: Academic Press.

Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. Developmental Psychology, 28 (1), 126-136.

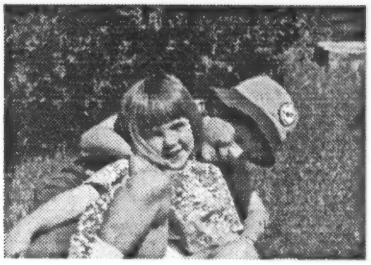
APPENDICES

A. The Photographs Used In The Sorting Tasks

B. Transcriptions Of The Children's Responses Arranged By Group

Appendix A: The Photographs

The photographs on the following pages comprise the twenty selected for this study. Although originally color photographs they are reproduced here in a reduced size digitised black and white format. Photographs were sorted in two sets of ten. The order of presentation was random with the photographs being shuffled for each child. The order of presentation of the two sets i.e. In and Out of context was also random and was selected by the child choosing the set they wished to do first. This choice was made on the basis of the color of the card backing the photographs, red and green.



Appendix B: Responses of the children by group

GROUP 1

Subject #1: Female, Age 9 years 2 months
Well she doesn't have a very happy look on her face, she's very sad
She looks like she's sad
They're smiling in these ones
They are happy
He has a frown
They're smiling they're happy
He's crying he's sad
She looks like she's sad because she's hurt herself
She's happy because she's smiling
She's sad because she's crying
He's happy because it looks like a class picture
She's smiling because she's enjoying herself
He's sad because he's crying
She's smiling because it's a school picture

Subject #2: Male Age 8years 8 months
She's smiling because she's happy
She looks happy because she's smiling too
She looks happy because she's making something
They're both smiling and they look happy
This one she's um sad because um she looks like she's crying
He's sad he's crying and he's telling his mom something and it looks like he's hurt himself right here
I can't tell this one, I think it's sort of sad There's too much light and it's too close
She's sad because she's crying and she hurt her elbow
This one I don't know, crying sad she's swimming
This she's happy cos she's smiling and she's um happy
He's smiling and he's happy too
She's not happy because she got a little scratch there, the brown
She's smiling again she's happy that's right
She's happy
This one he's sad because he got hurt right here
He's still sad here
She's happy and she's smiling
This little girl is crying and she's sad
This little girl is crying too

Subject #11: Male Age 7 years 3 months
Sad crying
Happy a smile
Happy again
Happy
Sad
Sad
Happy
Happy
Sad
Sad
SAd
Happy
Happy
Happy
Sad
SAd
Happy
Happy
Sad
Sad

Subject #12: Female Age 6 years 8 months
Sad he's starting to cry
Happy
Happy they're smiling
Sad tears in his eyes
Sad mouth
Sad, really sad I can tell by his tears
Happy
Happy
Happy grinning
Sad droopy mouth
Happy smile
Happy because she's helping
Sad he got hurt
er down in the balls, got hurt
Happy cos they're buddies
Happy

Sad
Happy smiling
Hurt and he's sad
Hurt and sad

Subject #19: Female Age 8 years 2 months
This one is happy because she is smiling
This one is happy because she is smiling too
This one is happy because she is smiling
This one is unhappy because she's crying
She's worried, sad
She's crying, sad
She's happy
This one's sad he's crying
This one's sad he's crying too
This one's happy
This one's happy because she's baking
This one's happy I think because she's feeding the chickens or some animals
This one's happy because she's playing with her brother or a friend
This one's sad because she got hurt in a big pile of balls
These are friends and they're happy
They're happy I think they are friends too
This is sad I think he tripped
This girl's sad it looks like because she doesn't want to take a bath
This one's sad she hurt her elbow
This one's sad because he hit his elbow or something

Subject #20: Male Age 7 years 10 months
Smiling, happy
Sad
Happy
Happy
Happy
Sad
Sad
Sad
Happy
Sad
Happy
He's smiling
Sad he's crying

Happy
Sad
Sad
SAd
Happy
Happy
Happy

Subject #21: Female Age 7 years 1 month
Happy cos she's smiling
He's happy cos he' laughing
He's sad because he's crying
He's sad cos he's bleeding
She's happy cos she's grinning
She's sad
She's angry most like sad
She's sad
She's happy
She's happy
Not so happy
Happy
Not feeling so good
Sad
Sleepy, sad cos his eyes are. he looks like he's going to weep
She's happy
She's happy
They're happy
She's sad
They're happy cos they have their arms around they're buddies

Subject #22: Male Age 6 years 6months
Happy cos she's smiling
Crying having a sad face
See here crying really sad face
Happy cos his mouth is happy
Happy
Sad
Um happy
Happy
Sad because her face sort of looks like she's sad
Sad because I can just see her eyes look like they're (makes a face)

Happy
Sad
Happy they have two friends
sad sad face
Happy
Happy because she has a friend
Happy because she's having fun stirring
Sad
Sad cos he's hurt
I think he's sad
Happy cos she's smiling she's in the car
Sad because she doesn't want to have a bath it looks like

Subject #24: Male Age 6 years 9 months
Um looks sad cos of her eyes and mouth
Happy
Um sad
Sad cos it looks like she's crying
Looks sad
Happy she's laughing
Happy
Happy cos they're smiling
Sad
Happy
Sad
Happy
Happy
Sad
Happy
Happy
Sad
Sad
Happy
Sad

Subject #28: Female Age 8 years 9 months
This one looks sad because of her face
This one looks happy
Sad well because he looks like he's gonna cry
Sad because she looks like she's gonna cry too
unhappy

Happy
Happy
Happy
Sad
Happy
Sad because he's crying
Happy because it's a school picture
Same with her
Sad because he bumped his chin
Happy, it's Christmas
Happy well because of his face
Sad because she's got scratches on her face
Sad she looks like she's crying
Happy her face
Sad cos he looks as if he's gonna cry

Subject #29: Male Age 10 years 1 month
Sad cos he's crying
Happy she's smiling
Sad
Sad
Happy
Happy
Happy she's smiling
Happy
Sad
Happy because they are playing
Sad because she's crying
Happy because he's with a friend
Happy because he's smiling at her picture
Happy because she's gonna eat chocolate pudding
Sad because he's dirty
Sad because she's crying
Sad because he's hurt
Happy because they're on a ride
I don't know about this one sad because she's dirty and she's taking a bath

Subject #30: Female Age 8 years 8 months
These kids are happy because they're smiling
Um sad cos she's crying
Happy cos they're hugging each other

That girl's happy because she gets to feed the bird
She's happy because she gets to mix pudding she'll probably eat it
He looks um nervous, sad
Sad cos
she's crying because she got hurt
He's crying sad
They seem happy because they're on a boat or something
She looks sad because she liked playing with that thing there and its empty
Sad cos he's crying
That guy looks happy
Happy because she's smiling
Crying sad
Happy because she's smiling, well all of them are smiling when they're happy
they're smiling
Happy
Crying cos she got all dirty so she must be sad
She's sad
She's happy
He's crying sad

Subject #31: Male Age 10 years 3 months
Sad he's tears in his eyes
She's happy cos she's smiling
I can tell that she's sad because of her face
I can tell that she's feeling sad because she looks like that
Happy because she's smiling
Happy because she's smiling
Sad because of his eyes
Happy because she's in the picture
Sad because he's crying
I can tell that she's sad because she has a funny like a sad face
I can tell that she's sad and unhappy
I can tell that she's happy too
I can tell that he's hurt and sad
I can tell that she's crying and she hurt her elbow
I can tell that (does that say St Hilda's?) I can tell that he hurt his finger
I can tell that she's happy that she's baking a cake
She's happy because she's got a smile
They're smiling because they are with each other
I can tell that she got hurt in there
I can tell that they are happy cos they are with each other

Subject #41: Male Age 6years 10 months
Sad cos he has a sad face
Happy cos she's smiling
Happy cos he's smiling
Happy cos she's smiling
Smiling, happy
Sad cos he is having his face like this
Sad cos she is going like this
She's smiling happy
Sad
Happy cos she's smiling
Sad she's um what do you call that word? she's sad
Happy they're smiling
Sad, she's um sad because she is going like this
Happy
Sad cos she is doing like this
Sad cos he is going like this
Sad
They're happy because they are smiling
He's sad he's like this

Subject #43: Male Age 6 years 10 months
Happy cos he has a happy face
Happy cos he has a great big smile
Happy cos she's grinning
Sad bit of a hurt face
Happy she has a big grin
Sad cos his eyes are squinting a bit
Happy big smile
Sad she has a frown
Sad a bit happy and sad, a bit sad cos it looks like she's crying and smiling a bit
Sad he's crying
Happy she has a big smile
Sad she has a hurt
Happy they are both smiling
Sad cos she's probably angry
Happy a big smile
Happy and frowning
Curious sad a bit
Sad
Happy cos they both have a smile

Sad cos he's hurt a bit

Subject #45: Female Age 10 years 4 months
They're happy because by the expressions on their face and because it looks like they're in a place that would make you happy
Happy because she's got the biggest smile on her face
Happy because they're together and I think that makes them happy
She looks sad because she looks like she's been injured and just by the expression on her face I can tell
Happy because they're smiling and their eyes are glowing and they just look happy
Sad because she's got a frown on her face and she looks unhappy about having a bath
Happy cos anyone who likes chocolate is happy when they have chocolate beside them
Sad because it looks like he's about to cry from the expression on his face
Sad because she's holding her elbow and she's frowning she doesn't look like, she doesn't have a smile on her face and it just looks like she's sad
Sad because it looks like he's been crying and he has a frown on his face
Happy cos she's got a great big grin
Happy because he looks happy
Happy, cos when people grin it doesn't mean they are sad
Sad because there are tears coming down his face
Happy because she is standing beside a Christmas tree
Sad cos he's got a frown on his face and his eyes are covered with tears
Happy because she's having a great big grin and it looks like she's laughing
Hmmm sad because her upper lip is sticking out
Sad because of the way her facial expression is
Sad, it's just that tears are coming down his eyes and he's frowning

Subject #59: Male Age 6 years 5 months
Sad because his mouth is all funny and it looks like he's crying
Sad because she has a mouth like that and it looks like she's crying
Happy because they have smiles on their faces
Happy because they have smiles on their faces
Sad well because she looks like she's crying
Happy because she's opening her mouth
Sad because she looks like she's holding her elbow like something hurt her
Happy well because they are driving in that boat and that is usually really fun
Happy because well it looks like she's feeding the birds
Happy well because he um usually looks like that when he's happy
Sad because of those tears on his face

Happy she's smiling
Happy
Sad because his face is sad
Sad because he's opening his mouth and it looks like he's crying
Happy her face is smiling
Happy she's smiling Sad because her face looks like she's sad
Sad because she looks like she's sad
Happy because he's smiling

GROUP 2

Subject #6: Female Age 5 years 6 months
Happy
Sad
Sad face
Happy a smile
Happy the smile
Happy
Sad because of his face (makes a face)
Happy
Happy
Sad
Happy smiles
Happy
Happy smiling
Happy
Happy
Sad face
Sad her face
Sad I can't see, sad
Sad

Subject #7: Female Age 5 years 9 months
Sad
Happy
Happy
Sad
Sad
Happy
Happy
Sad

Sad crying
Happy for take a picture
Happy
Happy
Happy
Sad
SAd
Sad
Sad
Sad
Sad
Happy

Subject #8: Female Age 5 years 9 months
Um happy
Happy
Sad cos he's crying
sad
Um happy
Um happy
Happy
Um sad cos he's crying
Um sad
Sad
Happy
Happy
Happy
Happy
Happy
Sad
Sad
Sad
Sad
Sad

Subject#9: Female Age 5 years 6 months
I think he's crying because his mother made him mad he did something wrong he's not supposed to do
I think she's happy because she has a new mother
I think she's happy she got a new hat
I think he's happy from getting new runners

I think she's worried, I think she's worried about her mom, sad pile
I think he got hurt, sad
Happy and I think she loves her dad
I think she's happy because she loves her mom
I think he's sad because he lost his dad
I think she's sad her mother died
This one's happy
Happy I could tell from their faces
Happy
I think she's sad because she didn't want to go in the tub
He's crying because he got hurt, sad
I think they are happy because they get to ride in some toy
I think she's happy she gets to help her mom
I think she's sad because she got hurt maybe someone hurt her
He looks worried, I can't see very well, he's sad
I think she's sad because she hurt her elbow

Subject #10: Male Age 5 years 4 months
Sad
Happy
Happy
When they're smiling they are happy when they are crying they are sad
Happy
Sad
Sad
Happy
Happy (You let your children bake by themselves?)
Sad
Sad
Sad crying
Happy
Happy
Happy
Happy
Sad
Happy
Is this her school picture? Happy
Sad
Happy

Subject #13: Male Age 6 years 2 months
Sad tell by her face
Sad
Happy cos they're smiling
Sad
Happy
Happy
Sad
Sad
Happy
Happy, faces tell you
Sad
Happy
Happy
Happy
Sad
Sad
Sad it looks like she has tears
Happy
Happy
Happy, no sad, he's crying

Subject #14: Female Age 6 years 3 months
Um she's happy because she's in her house
Um maybe he's sad because someone died
She's sad because her dog died
Um she's sad because she has a dirty face
He's happy because he has a new shirt
She's happy because she's playing outside
He's sad because the cat died
She's happy because she's hiding behind a chair
He's sad because he scraped his knee
She's happy because she had a haircut
She's sad because she had a bath
He's sad because he didn't want to go there
He's happy because he went on a ride
She's sad because she hurt her elbow
She's happy because she's having some snack
She's happy because she's helping her mom cook
He's sad because he hurt his finger
She's happy because her brother is tickling her

He's happy because he's hugging him
She's sad because she got hurt in the balls

Subject #15: Male Age 5 years 5 months
Happy
Sad
Happy
Happy
Happy
Happy
Sad
Sad
Sad
Sad
Sad
Happy, no sad sad
Happy
Happy
sad
Happy
Sad
Happy
Happy, smiling
Sad
Sad

Subject #17: Male Age 5 years 7 months
She's happy cos her grandma and grandpa, she's going to their house
Sad because her mom and dad are going away
She's a little bit sad from her face the mouth and the eyes
Happy cos he's smiling
Happy cos her mommy and daddy are back
Crying his diaper must be a mess, sad
Happy
Sad real sad
Happy
Sad because his face looks sad
Happy because they are playing with each other
Happy
Happy helping her mom cook
Boy is sad because it is raining and he wants to go outside and play

Sad maybe because her elbow is hurt and I can see that she's going waa waa
Sad because she doesn't want to get out the bathtub
Sad all right, sad because probably he doesn't want to leave
Sad
Happy all right happy buddies
Sad because she probably doesn't want to leave

Subject #18: Male Age 5 years 10 months
Happy cos she's smiling
Happy cos she's eating snack
Laughing, fighting happy
Sad cos she's grumbling
Happy
Happy cos she's smiling
Happy
Sad
Sad
Sad
Happy
Happy
Happy
Happy
Happy
Sad
Sad
Happy
Sad
Sad

Subject #60: Male Age 5 years 3 months
Sad because he has a sad face on
Happy cos she has a smile on
Happy cos she has a smile on
Sad cos he's crying
Sort of sad because he has a sad face
Happy cos she has a smile on
Happy cos she has a smile on
Sad cos she doesn't have a smile
Happy cos he has a smile
Sort of sad because she doesn't have a smile on
Happy cos she has a smile on

Happy they have a smile on their face
Not happy because she doesn't have a smile on
She's happy because she has a smile on
Not very happy because she's crying
Happy they have a smile on
Happy they have a smile
Not very happy because she doesn't have a smile on
Happy cos he has a smile on
Sad he doesn't have a smile

GROUP 3

Subject #3: Female Age 9 years 9 months
Um um yes um happy
He's happy going on the car
She's um got a sad face
Sad face
Sad face
That boy um sad face
Happy
Happy um she's baking something
Happy
Sad face
Happy
Happy cos she's pretty
Happy
Happy
She's sad she's crying
Sad
Happy
Sad face, crying yeah
Um crying sad
Happy
Happy, put his teeth out
I think she is happy

Subject #4: Male Age 6 years 10 months
Happy, sad um happy
Sad
Happy girl happy
Happy

Boy baby sad
Girl cat happy
This happy
I like it watch cry crying happy
Oh happy
Happy,sad, looks happy yeah
Crying sad
Crying happy, sad
Clock
Cry happy, sad
In the bathtub soap happy splash
Happy
Smile look happy
A cake, cake box happy face
Duck funny, she's crying sad
It's cool boat, sad

Subject #5: Male Age 6 years 6 months
What's she like ha ha happy
Oh looking happy yeah
Yeah she's uh happy
Er er boy baby happy baby
Sad
Well happy
Very happy
Oh er happy
Happy
Happy
Girl Happy
Happy
Well hey happy in that
In bathtub happy
Happy
Happy yeah like them
Outside sky, happy
Happy
Boy yes happy
Boys yeah happy faces

Subject #16: Male Age 8 years 9 months
Happy
That boy happy
Happy
Crying oh no sad
Happy
Happy
Happy
Happy
Happy
Happy
Happy, all done
Happy
That boy happy
]Sad in the bathtub
Er sad
Uh happy
Happy
Happy
Happy
Happy
Happy

Subject #23: Male AGe 7 years 7 months
Happy
Sad
Happy smiling
Sad
Happy
Ouch ow it hurts sad
Sad ow
Sad
Happy
Sad
Sad looks
Happy
Happy
(Sigh) sad
Happy
Happy
Sad

Happy
Happy
Sad

Subject #25: Male Age 7 years 10 months
Crying, happy no sad
Happy
Happy OK
Crying sad
This one (makes face) yeah happy
Which one? happy
He's crying
Happy happy
Happy smile
Oh crying oh
That's right crying happy yeah
Crying
This boy happy smiles
Happy smile
Don't know I think happy smile
Clock oh clock happy
(Makes face) sad
Crying yeah
Oh look this one happy
Happy

Subject #26: Male Age 8 years 2 months
Sad yeah
Them friends happy, sad sad
Good happy
Um sad
Sad right there a smile happy
Sad
Cry sad
Hurt sad
Truck it goes bye, happy
This bath sad, bubbles
Cry happy, sad
Laughing, sad
Sad
A cat sad

Sister sad
Christmas happy
Dark, happy, sad
Big girl happy
This girl? dark there happy, sad

Subject #27: Female Age 10 years 4 months
Um sad cos she's hurt
O Oh she's um bumped her head sad
Happy
Sad cos um the birds she doesn't like the birds
Happy she's um making a cake
Sad cos he got a bump there
Sad
He um hurt his knee sad
Happy cos they are on a ride
Happy she's in the bathtub
Sad um he hurt his eyes
Happy
Sad cos she bumped her head there
She's happy and she's got paint on
Happy
Happy cos she's um nice
He's hurt his chin
Happy she's doing a smiling
He's happy
Sad cos he's hurt his elbow

Subject #32: Male Age 6 years 5 months
Yes
Sad
O Oh
Cake
Good
..ppy
Bump oh bump
whoops hurt

Subject #33: Male Age 8 years 9 months
She is happy because this is a smile
He is happy he has a happy mouth

Sad because he is crying
He is happy because he is happy
Happy because a happy mouth
This girl is happy because the mouth is closed
This girl is happy
This little girl is happy because the mouth is happy
He is sad because he is crying
The baby is happy
They are happy because they are in a boat
He is happy because he is with his mom and he is happy
She is crying hurting herself sad
He is happy because he is looking at here (points)
This little girl is happy because there is food
She is happy because she has her own lunch
This little girl is happy because she is at Chuckie Cheese jump in the balls
This little girl is happy because there is bubbles and there is water
They are happy because they are holding on to each other
This one is a beaver, yes but I'm not a beaver any more I'm a cub, happy
Happy because they are playing

Subject #34: Female Age 7 years 2 months
Happy, new hat
Sad
In bath sad I think cry
Playing sad
Boy sad
Cake happy (points to mouth)
Sad
Sad
Happy and play
Happy
Sad cry
Sad
Happy smile
Happy
Sad
Sad
Happy
Sad
Happy he happy
Happy

Subject #42: Male Age 7 years 1 month
Happy
Sad looks sad
Sad waa
Oh (laughs) sad
Happy
Sad
Happy
Sad
Sad
Baby
Cool! happy happy
Happy cos I could tell
Sad
I think they are happy like me
Sad girl tears elbow
Oh sad
Whoa too sad face
Oh duck there happy as me
Happy as me
Happy as me happy like me
Looks like Mark and me
Bath bubbles oh sad
She's not, cook stirring careful and slowly happy like me

Subject #44: Male Age 7 years 11 months
Happy
Sad bath sad
Boys happy
Ball sad
Bird happy
What this is? happy
Um happy
Happy
Happy
Happy
Happy
Boy happy
Happy
Happy
Happy

Happy
Happy
Happy
Happy
Happy

Subject #46: Male Age 10 years 0 months
Happy (mimics face) happy face
Boy a happy his face
O that a baby he's fine a happy
Boy girl a friend happy face
Waa waa crying happy face
Hoo hoo crying a happy face
Well a girl happy face
Girl a happy face
Oh I happy, happy
Girl a happy face well this one a girl and a happy face
In bath happy face
Happy face
Look at her don't want to, happy face
They happy well look
Girl happy face
Girl happy
A happy face
A happy face yeah
A happy face

Subject #47: Male Age 7 years 5 months
He's sad he's crying
He's mad sad
Feeling sad
Happy
Happy
Sad
Happy
Happy
Sad
Happy
Sad
Sad
Sad

Happy
Sad
Happy
Sad
Happy
Happy
Happy

Subject #48: Male Age 8 years 11 months
Crying he sad
Happy she sad cos crying
This girl sad she stay home
Happy this smile
Cry sad
Happy because she smile
Cry sad
Happy cos smile
Smile good
Happy because she smiling
Sad he sad
Crying she because her mom go away, crying
Happy he has a mom
Happy cos of the smile
This has a bathtub sad she's sad
Smile friends
This girl having fun and she's crying sad
Happy cos he smile
Sad
Happy cos he's smiling

Subject #49: Female Age 9 years 5 months
Sad don't know
Yes face good one funny happy
Sad oh sad
Sad crying
Hat happy
Crying sad
Sad
Deaf sad
Happy
Sad sad crying

Pretty in car yeah happy
Happy by ducks
Pretty happy they happy
What's that? sad oh sad wow
Sad sad
Yes no top happy
Cook happy
Boy sad
Sad looks sad
Happy

GROUP 4

Subject #50: Male Age 2 years 7 months
Did not talk at all during task

Subject #51: Male Age 2 years 0 months
Crying sad
Cry
Crying
Happy
Crying
Outside happy
Crying, no happy
Happy
Happy
Painting he happy
Bang crying sad
Happy
That girl happy
Crying bad
These guys sad
Crying balls
Happy
Its good happy
Happy

Subject #52: Female Age 2 years 0 months
Crying sad
just just crying
Crying too

Happy
Happy
Baby is crying
Happy
Happy
Baby sad baby
Happy
Sad
Steven! happy
Happy
Happy
Happy
Happy
Happy
What's that? happy
Happy

Subject #53: Female Age 2 years 5 months
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Happy
Sad
That's happy
Happy sad
Happy
That's happy
That's happy
That's happy
That's crying sad yes

Subject #54: Female Age 2 years 6 months
Sad
Happy
Crying, crying
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Sad
Happy
Happy
Happy
Sad
Sad
Sad
Happy
Happy
Happy

Subject #55: Female Age 2 years 1 month
She's sad
It's boy it's boy happy boy
real sad
baby sad
he's happy
he's crying he's sad
It's hat happy
Happy one
Happy
That's happy
Sticky I want to hold it boy sad
More happy
A duck happy
That's more sad
Guys like Mark he's happy
These boys happy
In bath her happy, no her sad
He's happy

He's sad
This girl happy

Subject #56: Male Age 2 years 11 months
Happy
Sad
That girl is happy
Sad in a hat
Crying
Sad
Sad
Crying sad
Crying
Crying
Crying
Sad
Sad
Sad
Sad
Sad
Sad that girl is sad
That girl is sad too
That one is sad
Sad

Subject #57: Female Age 4 years 8 months
Happy because she's smiling
Happy smiling
Sad because he's frowning
Sad because he's frowning
Sad because he's frowning
Happy because she's smiling
Happy because she's smiling
Sad because she's frowning
Sad because she's crying
Happy because he's smiling
Sad because he's frowning
Um happy because she's smiling
Happy because she's smiling
Sad because she's frowning
Happy because she's smiling

Sad because she's frowning
Happy because they're smiling
Happy because they're smiling
Sad because she is frowning
Sad because he's frowning

Subject #58: Female Age 2 years 9 months
Sad I don't know
Sad I don't know
Happy I don't know
Happy
Sad
Happy
Sad
Sad
Sad
Happy
I don't know, sad one
Happy
Happy
Happy
Happy
Happy
Sad
Sad
Happy
Happy
Sad

Subject #61: Female Age 4 years 5 months
Sad his face looks sad
Happy by their smiling
Sad by his face
Happy because of their face
Sad her face
Happy uh from her face
Sad from her face
Happy because from their face
Happy her face
Sad from his face
Happy from well her face

Happy his face
Sad from her face
Sad by her face
Er happy from her face smiling
Happy from her face
Sad because from his face
Sad from his face
Happy from her face from her smiling
Smiling happy
Sad cos his face from his crying

GROUP 5

Subject #35: Male Age 9 year 2 months
This kid is happy because she is smiling
This boy is happy because he is laughing
This boy is sad because he is crying
This girl is happy because she is smiling
This girl is sad because she has a sad face
This girl because she is having a sad face
This girl is happy because she is having teeth
This girl is happy because she is smiling a bit
He is sad because he is doing like this (mimics)
This little boy is sad because he is walking and crying
This boy and girl are happy because they are in a ride
This boy is sad because he was lying
This girl is sad because she bumped her elbow
This boy is sad because he is bleeding
This girl is happy because she is making chocolate cookies
This girl is happy because she is feeding the birds
This girl is sad because she can't get up
This girl is sad because she is bleeding on the knee
These boys are happy to be together
This boy and girl are happy because they are hugging

Subject #36: Female Age 6 years 8 months
Sad he's crying
Happy I don't know
Sad she's crying too
Sad because her face is messy
Sad he's crying

Crying too sad
Happy cos she has a picture
Happy because he has a picture too
Happy
Happy because she has a new hat
Sad cos no more bubble stuff
Sad cos she's hurt
Happy
Sad because she got hurt on something
Sad because he fell
Happy cos they are plying nice
Happy cos they got a picture
Happy because there is a bird
Happy because she gets to make something
Happy because they are getting a ride on a boat

Subject #37: Male Age 7 years 9 months
Sad because he's crying
Happy because she is making a happy face
sad she has I don't know
Sad paint on right here
The same sad
Crying a baby sad
Happy cos having a picture
Happy laughing
Happy again
Happy again
Sad crying in the bath didn't want it
Sad she hurt
Sad I don't know
Sad elbow hurts
Sad cos he's hurt
Happy cos they are playing
Happy cos they are friends
Happy I don't know
Happy cos she's helping mommy
Happy cos they are having a ride

Subject #38 Female Age 7 years 11 months
Happy because he's got a smiling face
Happy because he's got a happy face

Happy because he's got a happy face
Happy because she's got a happy face
Sad because he's got a sad face
Sad got a sad face
oh sad because she's got a sad face
Happy because she's got a happy face
Sad
Sad because she hurt her elbow
Sad because he has a sad face
Sad because she lost a ball
Sad because she's in the bathtub
Let me see, happy because she has a happy face
Happy happy face
Happy because she's got a happy face
Happy because they've got a happy face
Happy because they've got happy faces
Happy because he's got a happy face

Subject #39: Male Age 8 years 9 months
This one's sad
This one's happy smiles
Happy cos she has a smile
Happy cos he's smiling
She is smiling, a girl smiling happy
Sad cos he's crying
She's happy cos she's smiling
Sad cos she's crying
Happy cos she's happy
Sad cos she's crying
Happy she's smiling
Sad cos she doesn't like water
Happy cos they're smiling
Crying sad
Happy cos she's smiling
Happy cos they're smiling
Sad cos he's sad
Sad cos she's hurt
They're happy because they are smiling
Crying crying crying, sad

Subject #40: Male Age 6 years 10 months
Sad because his mommy is not here
Yes he's happy that guy is playing
Sad because she got a hurt there
Um sad he's crying
These guys have got a boat! Happy
Good cos she's good
Sad because she's scared on there
Happy because they are in a snake hug
Sad scared
Happy because she is making cinnamon
He is sad because his mommy is not here
She is happy because she is not crying
Sad she's crying
She is sad because she is crying
He's sad he's crying too
This girl is happy because she is wearing a fireman hat
Happy because he is not crying
SHe is happy and she is not crying too
Crying his mom is not here and his dad is not here he is crying, sad
O I watch that TV show She is happy because she was singing skinnymarinkydoo